

Challenges Experienced by Students at Stellenbosch University that Hinder their Ability Successfully to Learn Online during the COVID-19 era: A Demographic and Spatial Analysis

Anthony J. Onwuegbuzie^a, Emmanuel O. Ojo^b, Annie Burger^c, Talitha Crowley^d, Samantha P. Adams^e, and Bryan J. Bergsteed^f

^aFaculty of Education, University of Cambridge, England; Department of Educational Leadership and Management/Department of Educational Psychology, University of Johannesburg, Johannesburg, South Africa; and Dialectical Publishing, LLC, Bloomington, IN, USA; ^bSchool of Education, Faculty of Humanities, University of the Witwatersrand, Johannesburg, South Africa; ^cDepartment of Afrikaans and Dutch, Faculty of Arts and Social Sciences, Stellenbosch University, South Africa; ^dDepartment of Nursing and Midwifery, Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa; ^eDepartment of Industrial Psychology, Faculty of Economic and Management Sciences, Stellenbosch University, South Africa; ^fDivision of Clinical Anatomy, Department of Biomedical Sciences, Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa

ABSTRACT

The purpose of this meta-methods study (i.e., involving the full[er] integration of multiple methods research approaches and mixed methods research approaches) was to examine challenges experienced by students at Stellenbosch University that hinder their ability successfully to learn online during the emergency remote teaching that began in April 2020 due to the COVID-19 pandemic. Specifically, 1,932 students completed an online questionnaire. Analyses of the open-ended responses via WordStat 8.0.29 topic modeling (i.e., crossover mixed analysis) led to the identification of seven (challenge) themes that categorised the students' challenges. In turn, via a principal component analysis of the themes (i.e., crossover mixed analysis), these seven themes were collapsed into four dimensions (i.e., meta-themes). A latent class analysis (i.e., qualitizing) yielded seven profiles of students. Disaggregating the themes by demographic and location variables led to the identification of subgroups who are most at risk for experiencing each challenge type. Implications of these and other findings are discussed.

KEYWORDS

Stellenbosch University; COVID-19; meta-methods research; quantitizing; qualitizing; topic modelling; mental health; student online learning readiness; demographic analysis; spatial analysis

Stellenbosch University Context

On 11th March 2020, the World Health Organisation declared the COVID-19 crisis to be a global pandemic. However, a month prior to this announcement, Stellenbosch University (SU) constituted a Contingency Committee to deal with the local spread of COVID-19 in South Africa, and the response to deal with the rapid nature around which circumstances could change. It was 2 days later, on the 13th March, when SU took deliberate steps to mitigate infection amongst its staff and student communities. Firstly, there was an immediate cancellation of the March/April 2020 graduation ceremonies, as well as the postponement of the installation ceremony that would welcome SU's newly appointed Chancellor, Justice Edwin Cameron. Moreover, all conferences scheduled to take place on the SU campus were cancelled until further notice. However, the academic programmes were all required to continue as normal, while a contingency plan was being formulated by all faculty deans and managers should the need arise. Travel bans were announced for international travel, while staff and students who were already abroad would need to quarantine for 14 days upon arrival in South Africa. The very first communiqué concluded with detail about the new dedicated webpage that was created for the dissemination of all coronavirus-related news (Retief, 2020a, 2020b).

The first presidential address took place on the 15th March—which would become informally known as a *family meeting*—where President Cyril Ramaphosa addressed the concerns related to the spread of coronavirus in South Africa. At this point in time, there was an estimated “162 000 people who had tested positive for the coronavirus across the globe” (Ramaphosa, 2020a, para. 4). Locally, a total of 61 cases were confirmed across

South Africa's nine provinces, comprising a large majority of individuals who had travelled from Italy—the epicentre of European infections at the time—who had tested positive. The global pandemic was declared a national state of disaster. The next day, SU announced the immediate suspension of all lectures from Tuesday, the 17th March, stating that they would continue via online tuition from the 30th March for all academic programmes (De Villiers, 2020e). Furthermore, there was an immediate plea for all university residences to be vacated with immediate effect, urging students to return to their homes (Kloppers, 2020). Ultimately, what started out as an institutional contingency committee—formed 6 weeks prior—was converted into the Institutional Committee for Business Continuity (ICBC), prioritising the impact of the global pandemic on all university programmes and structures for the foreseeable future (De Villiers, 2020e). Two days later, on the 19th March, SU confirmed its first positive COVID-19 case (De Villiers, 2020d). The person was a staff member at the Faculty of Medicine and Health Sciences, who had recently travelled abroad, but was in isolation and “being treated under the supervision of the Provincial and National Departments of Health” (De Villiers, 2020d, para. 1). This infection was deemed to be low risk to the staff and students at the medical faculty, but the situation was being closely monitored. According to the SU registrar, Dr Ronel Retief, the “safety of employees and students remains our primary concern” (Retief, 2020d, para. 5).

Although the university had been “heeding the call to adapt the way we live and work to mitigate the possible local impact of the COVID-19 pandemic” (Schoonwinkel, 2020b, para. 1), the Vice-Rector for Learning and Teaching, Professor Arnold Schoonwinkel, released two statements on the 23rd March: one to students, and the other to staff. In both statements, the university unanimously prioritised a scenario whereby the pandemic would not be over soon; according to Schoonwinkel, “what if contact lectures cannot continue after 14 April” (Schoonwinkel, 2020a, para. 3). From the 30th March, all lecturing and teaching support would be conducted online indefinitely, while online assessment would only resume on the 14th April, representing an attempt to provide a reasonable period for students and staff to familiarise themselves with the online learning environment (Schoonwinkel, 2020b).

Meanwhile, that night—1 week after South Africa's first *family meeting*—the president addressed the nation once more. In this address, he reiterated the global devastation caused by the coronavirus pandemic, with 340,000 cases confirmed across the globe, and more than 402 cases spread across the country (Ramaphosa, 2020b) (up from 61 confirmed cases since the previous address [Ramaphosa, 2020a], 1 week prior). Ramaphosa added that “As a consequence, the National Coronavirus Command Council has decided to enforce a nationwide lockdown for 21 days with effect from midnight on Thursday 26th March” (Ramaphosa, 2020b, para. 33). The government instituted the country's first national lockdown as a direct result of the COVID-19 pandemic.

Later that week, on the 26th March, the SU rectorate—responding to the president's Monday night address—acknowledged the complexity of completing the 2020 academic year with the start of the lockdown set for midnight that day. Recalling a meeting that took place on Tuesday between the other South African Vice-Chancellors, in an online meeting of Universities South Africa (USAf), SU's rector and vice-chancellor, Prof. Wim de Villiers, reiterated that “our students should not lose an academic semester or a year” in relation to the limitations of a warranted national lockdown (De Villiers, 2020c, para. 3). Furthermore, the start of the second academic term (of the first academic semester) would be pushed to the 20th April for the student body, whereas staff were encouraged to “familiarise themselves with online teaching via webinars and to adapt their teaching materials to be fully online by 20th April” (De Villiers, 2020a, para. 7). Moreover, all students were sent a survey to “help SU determine their level of readiness for online learning activities, including access [to e-learning resources] by means of personal devices and internet connectivity” (De Villiers, 2020c, para. 11).

Over the next few days, and weeks, SU continued to provide every possible resource catered towards help after a rapid shift towards online education. Very soon, a detailed list of contactable staff members was made available to assist with student administration-related matters (Retief, 2020c). Additionally, there were many academic-related concessions made to cater for students who were struggling during this turbulent time—with the expectation that online learning would continue throughout Semester 1, “where a Semester 1 module is a prerequisite for admission to a Semester 2 module students will be allowed to continue with semester 2, irrespective of having passed the prerequisite module or not” (Du Plessis, 2020a, para. 4). According to du Plessis (2020a), the ICBC chairperson,

The University is exploring ways to assist specifically socio-economically disadvantaged students who indicated on the survey that they do not have access to a device to be assisted at home with computers within the constraints of the lockdown regulations and what is practically possible. (para. 6)

Du Plessis (2020a) reiterated this type of support, stating that “Colleagues who may know of students who need support are also requested to send an email with the student's name, student number, academic pro-

gramme and contact details to” the University (Du Plessis, 2020a, para. 6). Again, students were presented with more scenarios related to the completion of the academic year:

For students who cannot complete Semester 1 online due to online connectivity issues (device or internet or both), a re-run of Semester 1 modules in hybrid learning mode will be available in the second half of 2020, with an exam opportunity in January 2021 for specifically Semester 1 (2020) modules. The hybrid learning mode will consist of mostly online learning of archived first-semester lectures and other materials, with limited contact teaching sessions as far as practicable. (Du Plessis, 2020b, para. 7)

“Making sure that our academic programmes will continue and culminate in a successful study year for our students is non-negotiable to us,” De Villiers (2020b, para. 6) reiterated SU’s successes further, stating that he:

ha[s] watched in awe over the last few weeks how my community of purpose, the SU management team and all the colleagues across the university, have worked tirelessly to ensure the successful continuation of the academic year and the efforts that go into safeguarding the continued well being and existence of our institution in all respects. (De Villiers, 2020b, para. 6)

The Context Of Higher Education

Higher education has been undergoing substantial changes in the 21st century (Iloh, 2018; Tierney & Lanford, 2016). Funding from government has reduced globally (Parker, 2012), higher education has become more expensive, and graduate unemployment is on the rise (Lauder & Mayhew, 2020). In addition to these developments is the notion of massification (i.e., increasing enrolment of students) of higher education (Giannakis & Bullivant, 2016; Hornsby & Osman, 2014; Mohamedbhai, 2014). Giannakis and Bullivant (2016) expatiated on massification and argued that

[t]he intensified economic pressures that universities are faced with to cope with the increasing number of students, has led to a reliance on non-governmental resources for their survival. This growth presented new challenges for higher education institutions and implications for their operation. Such challenges are manifested naturally in relation to the quality and standards of teaching and learning, but also in the quality of the full range of student services (from IT [information technology] support and accommodation to cultural events, counselling and career advise). (p. 630)

Access to higher education links to equity, with more students being given the opportunity to attend higher education institutions (HEIs) for the first time (Giannakis & Bullivant, 2016). Opportunities for more sophistication in open and distance learning (ODL) became possible through global Internet penetration and the use of learning management systems (LMS).

With all the transformation happening in higher education, it is likely that few university administrators anticipated or were well-prepared for a global pandemic of the magnitude that universities started experiencing in 2020. For the purposes of this editorial, we use the phrase *higher education* to represent post-school education in general and universities specifically. The pandemic resulted in a very unsettling academic year across the world. Many universities implemented varied strategies to cope with the impact. This section of the review explores and engages the literature to present insights on the origins of the global pandemic and to present the key incidences, its impact on higher education, and how universities have managed through the disruption caused by it. The discourse focuses on students and their university experiences through the pandemic in relation to online teaching and learning.

The SARS-CoV-2 Virus: Understanding Its Origins And What Makes It A Global Pandemic

The SARS-CoV-2, the virus that causes coronavirus disease 2019, currently is responsible for the COVID-19 pandemic and was first discovered in Wuhan, China, in December 2019 (World Health Organisation [WHO], 2020a). The first patient, *patient zero*, was recorded on 1 December 2019 and the first recorded incidence that resulted in hospitalization was on 16 December 2019 in Wuhan (Huang et al., 2020). Through global mobility and travel, an outbreak in a small city in China became a global pandemic within several weeks. As of February 2020, the global cases increased to 83,652 (WHO, 2020b). Egypt recorded the first case in Africa on 14 February 2020 (Egypt Today Staff, 2020) and Nigeria was the first in the sub-Saharan Africa (SSA) (British Broadcasting Corporation [BBC], 2020a). Nigeria recorded the first case on 28 February 2020 (BBC, 2020a). By March/April 2020, when the entire world went into panic with the incidences in Italy far exceeding the capacity of their health system (BBC, 2020b), the initial reaction across the world was a total shutdown. Little was known about the

virus, and the global health research infrastructure—including research capacity in universities—conducted collaborative global health research to understand the virus. In March 2020, the WHO announced that the COVID-19 outbreak was a global pandemic. With the entire world thrown into panic, not knowing what to do other than to implement total lockdown, several universities urgently began implementing varied strategies to manage the shock and to adapt teaching and learning through online platforms. The outbreak had increased to 3,090,445 incidences, with 217,769 deaths, globally by April 2020 (WHO, 2020c). During the same month, Africa had experienced 24,713 incidences and 938 deaths (WHO, 2020c). This made the WHO describe the risk assessment as being very high.

Since the pandemic started, the focus has shifted from its origins to other developments related to the countries with the highest global incidences, the vaccine development and distribution, and its effectiveness as new variants of the virus have been discovered. China has successfully managed the pandemic (Burki, 2020). According to the Burki (2020),

As of Oct 4, 2020, China had confirmed 90,604 cases of COVID-19 and 4739 deaths, while the USA had registered 7,382,194 cases and 209 382 deaths. The UK has a population 20 times smaller than China, yet it has seen five times as many cases of COVID-19 and almost ten times as many deaths. (p. 1240)

At the time of writing, there are more than 100 million cases globally, with the United States, India, Brazil, and United Kingdom leading global incidences of the virus (Johns Hopkins University [JHU], 2021). The endemic characteristic of viruses that they mutate was put forward in an article published in *The Nature* in September 2020 (Callaway, 2020). Since then, four new variants—the *Brazilian*, *English* (also known as the *Kent variant* because it was first identified in Kent), and *South African variants*—have been identified (Mahase, 2021)—as well as, most recently, the Indian variant (i.e., B.1.617), which was first identified in India in October 2020. Although scientists are concerned with and researching the impact of mutation on the effectiveness of vaccines, at the time of writing, at least seven vaccines—Pfizer BioNTech, Moderna, Oxford AstraZeneca, Janssen, Novavax, Sputnik V, and Sinopharm—have been developed and are currently being distributed across the world.

Higher Education And Emergency Remote Teaching And Learning (ERTL): Issues And Insights

At the inception of the total lockdown resulting from the COVID-19 pandemic in March 2020, 1.3 billion learners were unable to attend school or university (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2020). This staggering figure confirmed that the impact of the pandemic on schooling was at an unprecedented scale. This shock affected universities globally, bringing about the questioning of the future of higher education in a highly digitalized world (Gallagher & Palmer, 2020). Because universities around the world were forced to close their doors to students, many made a quick transition to online teaching and learning. The efforts put in place were across the global north-global south divide and many universities extensively depended on both open source and proprietary learning management systems (LMS) to deliver their classes online (Ali, 2020; Ferri et al., 2020; Gallagher & Palmer, 2020).

Globally, universities adapted teaching and learning at the heart of the pandemic to cope with the disruption caused (Ali, 2020; Bozkurt et al., 2020; Ferri et al., 2020; Onyema et al., 2020). What was implemented was an Emergency Remote Teaching and Learning (ERTL; Czerniewicz et al., 2020), which, in itself, has implications for the economic situation of nations. In South Africa, for instance, the ERTL strategy implemented by universities in the heart of the lockdown exposed the unspoken inequality already existing in the society. Czerniewicz et al. (2020) declared the following:

the ERTL shift would inevitably play out differently across the HE [Higher Education] sector given the variety of institutional types categorised in different ways: rural and urban, old and new, Historically Advantaged Institutions (HAIs) and Historically Disadvantaged Institutions (HDIs), and 'research-intensive', 'comprehensive' and 'universities of technology'. (p. 947)

South African universities who were able to adapt were the Historically Advantaged Institutions (HAIs), which were research-intensive universities (i.e., universities who are leading South Africa's national research productivity indices and are regularly featured in global ranking of universities), whereas the Historically Disadvantaged Institutions (HDIs) struggled to adapt to the pandemic (Omodan, 2020; Wangenge-Ouma & Kupe, 2020).

Although the global south presented earlier drew on the South African context, other studies have led to the realization that the kind of issues faced in the global north has been of a different dimension. Access was not so much of a challenge but the need to re-evaluate the cost of higher education in the pandemic, especially when previous traditionally taught programmes went fully online due to the pandemic (Gallagher & Palmer, 2020).

Gallagher and Palmer (2020) noted that, “a number of elite institutions—such as Princeton University, Williams College, Spelman College, and American University—have substantially discounted tuition for their fully online experience in an historically unprecedented fashion, highlighting pricing pressures and opening up Pandora’s box” (para. 3).

University Students’ Experiences Of Teaching And Learning In A Global Pandemic

We have acknowledged the challenges of access and the cost of higher education in the global pandemic as key insights. However, the discourse will be incomplete without examining students’ experiences of university life in the context of the emergency remote teaching and learning. A number of researchers have examined university students’ experiences and presented key insights into how university students experienced teaching and how they adapted to learning differently online (Aristovnik et al., 2020; Hussein et al., 2020; Meulenbroeks, 2020; Ojo & Onwuegbuzie, 2020; Rohman et al., 2020). Across these many studies, the underlying thread is that students had diverse experiences in universities across the world. Depending on the infrastructure accessible to the university (O’Keefe et al., 2020) and that which the students had in the home context, students’ experiences linked very strongly to the peer-to-peer and institutional support (Gillis & Krull, 2020; Nerantzi, 2020) to which they had access. However, more research is needed in this area, especially in a country where there is a more contagious variant of COVID-19 that has the potential to prolong the lockdown period—as is the case in South Africa.

Purpose Of The Study

The purpose of this editorial was to examine the challenges experienced by students at Stellenbosch University that hinder their ability successfully to learn online during the nationwide lockdown resulting from the COVID-19 pandemic. Representing a replication and extension of the study of Ojo and Onwuegbuzie (2020), the present study specifically investigated the challenges experienced by students as a function of an array of demographic data (i.e., gender, age, the student’s level of study, locality of students, enrolment status, and home situation) and spatial data (i.e., the location where remote learning took place) to provide insights into their challenges associated with emergency remote learning.

Research Question

Using Plano Clark and Badiee’s (2010) typology, the research question (i.e., central research question) that drove this study was what these authors termed as a general overarching mixed methods research question. According to Plano Clark and Badiee (2010), a general overarching mixed methods research question is a broad question that is addressed using *both* quantitative and qualitative research approaches. Moreover, this question allowed the researchers to utilize the $1 + 1 = 1$ mixed methods-based integration formula, which was introduced by Onwuegbuzie (2017) to denote the full integration of qualitative and quantitative elements at the data collection, data analysis, and data interpretation phases (see also Onwuegbuzie & Hitchcock, 2019a; Onwuegbuzie & Johnson, 2021). Specifically, the following central research question was addressed: What challenges have been experienced by students at Stellenbosch University that hinder their ability successfully to learn online during the COVID-19 pandemic?

It was hoped that findings from this study would add to the scant body of literature on the impact of COVID-19 on students enrolled in South African universities. Also, it was hoped that findings from this study would provide useful information for administrators of Stellenbosch University, as well as other South African universities.

Method

Participants

A total of 1,932 students who were enrolled at Stellenbosch University in 2020 participated in this study. These participants were recruited via convenience sampling. One of the participants was classified as being a member participant (Adler & Adler, 1987) because she was both a researcher and a participant in this study. The participants represented 6.1% of the total student body of Stellenbosch University in 2020. The majority (59.4%) of participants were women, 39.9% were men, and 0.7% were non-binary. This is similar to the total student body

of Stellenbosch University because the majority (55.5%) of students were women, while 44.4% of students were men. Regarding age of participants, 73.8% were between 18 and 24 years old, 15.1% were between 25 and 35 years old, 6.5% were between 36 and 45 years old, 3.6% were between 46 and 55 years old, and 0.9% were older than 56. Approximately two thirds (68.8%) of participants were undergraduate students, whereas the remaining (31.2%) were postgraduate students. This distribution also is consistent with the total student body of the University wherein 64.3% of students were undergraduate students, 33.2% of students were postgraduate students, and 2.6% of students were occasional students. Of the postgraduate participants, 45.1% were enrolled for a Master's degree, 42.9% were enrolled for an Honours degree, and 12% were enrolled for a Doctorate degree. This distribution is consistent with the total student body of the University, wherein 45.7% of students were enrolled for a Master's degree; 39% were enrolled for an Honours degree, a Postgraduate Diploma/Certificate, or a Postgraduate Bachelors; and 15.4% were enrolled for a Doctorate degree. The overwhelming majority of participants (92.4%) were local students, whereas 7.6% were international students. This distribution is consistent with the total student body of the University, wherein 90% of students were local students and 10% were international students. Further, the vast majority (89.3%) of participants were full-time students, whereas 10.7% were part-time students. The highest proportion of participants represented the Faculty of Economic and Management Sciences (24.4%), followed, respectively, by the Faculty of Engineering (16.1%), the Faculty of Arts and Social Sciences (15.4%), the Faculty of Medicine and Health Sciences (14.9%), the Faculty of Science (11.6%), the Faculty of AgriSciences (5.7%), the Faculty of Education (5.2%), the Faculty of Law (4.5%), the Faculty of Theology (1.7%), and the Faculty of Military Sciences (0.5%). This distribution deviates slightly from the total student body of the University, wherein 26.9% of students were enrolled at the Faculty of Economic and Management Sciences, followed by 16% at the Faculty of Arts and Social Sciences, 14.9% at the Faculty of Medicine and Health Sciences, 12.4% at the Faculty of Engineering, 10.1% at the Faculty of Science, 7% at the Faculty of AgriSciences, 5.8% at the Faculty of Education, 3.1% at the Faculty of Law, 1.9% at the Faculty of Theology, and 1.8% at the Faculty of Military Sciences.

Although many participants also worked remotely from where they lived, this was not always the case. Table 1 presents the countries, provinces, and cities where participants lived, and the countries, provinces, and cities where participants worked remotely.

Table 1. Where participants lived and where participants worked remotely during lockdown.

	Where participants lived	Where participants worked remotely
Country		
South Africa	96.2%	95.1%
Namibia	1.9%	1.9%
Province		
Western Cape	70.2%	72.9%
Gauteng	9.5%	8.0%
KwaZulu-Natal	6.0%	5.3%
Eastern Cape	4.1%	3.4%
Northern Cape	2.2%	2.1%
Limpopo	1.4%	1.2%
Khomas, Namibia	1.2%	1.2%
Mpumalanga	1.1%	-
Free State	1.0%	1.0%
City		
Cape Town	33.8%	32.0%
Stellenbosch	11.7%	17.9%
Johannesburg	4.6%	3.7%
Somerset West	3.4%	3.3%
Pretoria	2.7%	2.5%
Durban	2.5%	2.2%
Paarl	2.3%	2.2%
Durbanville	1.4%	1.3%
George	1.2%	1.0%
Windhoek	1.2%	1.2%
Bellville	1.1%	-
Worcester	1.1%	1.1%
Gqeberha	1.0%	-

Note: Countries, provinces and cities that less than 1% of participants selected are excluded from the table.

Regarding distance from home to Stellenbosch University, 51.4% of the participants indicated that they lived less than 50 kilometres from the University, 27.7% lived more than 500 kilometres from the University, 10.8% lived between 50 and 99 kilometres from the University, 4.2% lived between 200 and 499 kilometres from the University, 3.9% lived between 100 and 199 kilometres from the University, and 2% did not indicate how far they lived from the University. Table 2 presents the distribution of the device(s) to which participants had access, the distribution of the device(s) to which participants had access at home, the distribution of the ways that participants had access to the Internet at home, and the distribution of the participants' cell phone providers, respectively.

Table 2. Access to devices and Internet.

Device access	
Laptop	90.6%
Smartphone	86.6%
Tablet	15.4%
Desktop computer	12.5%
Hybrid or 2-in-1 device	1.8%
None	0.1%
Device access at home	
Smartphone	92.4%
Laptop or desktop computer with a webcam	84.2%
Tablet	19.9%
Laptop or desktop computer without a webcam	11.2%
None	0.3%
Access to Internet at home	
Cell phone data	63.8%
Fixed home Internet connection	52.6%
Wireless home Internet connection	36.4%
Home Internet connection of a family member or friend	5.9%
Other	0.5%
Cell phone providers	
Vodacom	46.1%
MTN	24.2%
Telkom	20.5%
Cell C	15.2%
Other	5.1%

Research Design

In the current study, both qualitative data (via open-ended items) and quantitative data (via closed-ended items such as Likert-format items) were collected via an online questionnaire. Specifically, a research design labelled by Leech and Onwuegbuzie (2009) as a *fully mixed concurrent equal status design* was used. This design involves conducting a study that mixes qualitative and quantitative research within one or more or across the following four components in a single research study: the research objective, type of data and operations, type of analysis, and type of inference. In this study, the quantitative and qualitative phases were mixed concurrently across all these components, with both the quantitative and qualitative components being given approximately equal weight. According to Guest (2013),

The move toward simplification is laudable and the typology developed by Leech and Onwuegbuzie (2009) is an important contribution. Their eight-design typology reduces much of the confusion surrounding the vague boundaries between designs that is typical of other typologies. The terms they use are intuitive and do simplify the classification process. (p. 145)

Further, this investigation involved use of a *multi-mixed methods research approach* and a *meta-methods research approach*. According to Onwuegbuzie and Hitchcock (2019b)—who coined these terms—a multi-mixed methods research approach involves the partial integration of multiple methods research approaches and mixed methods research approaches. Contrastingly, a meta-methods research approach involves the full(er) integration of multiple methods research approaches and mixed methods research approaches. Specifically, this inquiry represented a multi-mixed methods research approach because it included the use of *non-crossover mixed analyses* that involved quantitative analyses of quantitative data (i.e., *quantitative monoanalysis*) integrated with qualitative analyses of qualitative data (i.e., *qualitative monoanalysis*). At the same time, this investigation rep-

resented a meta-methods research approach because it also included the use of *crossover mixed analyses* (i.e., Onwuegbuzie & Combs, 2010), wherein one or more analysis types associated with one tradition (e.g., quantitative analysis) were used to analyse data associated with a different tradition (e.g., qualitative data). Therefore, the mixed methods analysis approach utilised in the present study involved an integration of non-crossover mixed analyses and crossover mixed analyses that yielded meta-inferences, wherein the interpretations stemming from these analysis approaches were integrated into a coherent whole (Onwuegbuzie & Johnson, 2021).

Research Philosophy

Underpinning this study was a research philosophical stance that Onwuegbuzie and Frels (2013) referred to as a critical dialectical pluralistic stance. According to Onwuegbuzie and Frels (2013), this stance is based on the assumption that, at the macro level, social injustices permeate every society. Through this stance, a major goal of the study was to provide information that would empower students, teachers, and administrators enrolled in South African universities, and beyond, to make data-driven decisions regarding how to negotiate successfully students' learning processes during this COVID-19 era.

Results

Instruments And Procedure

The instruments and procedure of this study was approved by Stellenbosch University's Health Research Ethics Committee on 2 November 2020. The instrument used in this study was an online questionnaire. This questionnaire was sent out to all undergraduate and postgraduate students at Stellenbosch University between 14 December 2020 and 20 January 2021. The questionnaire was built on SUNSurvey, the University's questionnaire management system, and was sent out via the SUNSurvey system, administered by one of the researchers. To enhance the response rate of the study, as approved by Stellenbosch University's Health Research Ethics Committee, a chance of winning a R2,000 Takealot voucher was included as an incentive. Table 3 illustrated the frequencies of responses by week according to the gender of the participant, the degree they were registered for, and faculty at which the participant was enrolled. It can be seen from this table that Week 1 and Week 4 generated the most responses.

Table 3. Frequencies of responses by week according to gender, age, degree registered for and faculty enrolled at.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Gender						
Woman	515	23	11	515	73	11
Man	331	15	3	377	36	8
Non-binary	4	1	0	5	3	1
Age						
18-24	593	32	10	677	96	18
25-35	149	5	2	126	8	2
36-45	60	1	0	60	5	0
46-55	38	1	2	26	3	0
56-65+	10	0	0	8	0	0
Degree registered for						
Bachelors	558	26	10	568	96	16
Honours	113	7	2	149	8	3
Master's	137	6	2	145	6	1
Doctoral	42	0	0	35	2	0
Faculty						
AgriSciences	45	3	1	53	8	0
Arts and Social Sciences	132	5	1	133	23	4
Economic and Management Sciences	206	9	2	231	21	2
Education	45	2	0	45	5	3
Engineering	130	7	3	143	23	5
Law	44	0	1	36	5	1
Medicine and Health Sciences	137	7	4	128	12	0
Military Sciences	4	0	0	4	2	0
Science	95	5	2	106	12	5
Theology	12	1	0	18	1	0

The questionnaire consisted of six sections. The first section contained demographic items; the second section measured students' perception of readiness and motivation for online teaching, learning, and assessment that was measured via a Likert-type scale; the third section also included a Likert-type scale, which measured student engagement during COVID-19 disruption; the fourth section consisted of the 9-item Utrecht Work Engagement scale for students, representing a Likert-type scale; the fifth section contained Likert-type items that measured students' attitude towards COVID-19 and its impact on higher education; and the last section consisted of the following open-ended questions: "To what extent do you consider your current home situation suitable for online learning?"; "What personal challenges do you have that could hinder your ability to successfully learn online?"; and "Please provide any general comment that you think might be useful to share." For the purposes of the present study, alongside the demographic variables, responses to only the following open-ended question were analysed: "What personal challenges do you have that could hinder your ability to successfully learn online?"

Central Research Question: What Challenges Have Been Experienced By Students At Stellenbosch University That Hinder Their Ability Successfully To Learn Online During The COVID-19 Pandemic?

Topic Modeling Of Responses

WordStat 8.0.29 (Provalis Research, 2020) was used to conduct topic modeling via a factor analysis to identify the main topics (i.e., themes) from the responses to the aforementioned open-ended question. Table 4 presents the high-probability terms from the $k = 7$ topic model for each of seven topics in the corpus of responses. For each topic, as advocated by topic modelists (e.g., O'Callaghan et al., 2015; Provalis Research, 2014), this table lists the 10 high-probability terms that best distinguish each of the seven topics from each other. It can be seen from this table that the following seven topics emerged from the corpus:

- 1) Topic 1: Internet Connection;
- 2) Topic 2: Mental Health;
- 3) Topic 3: Personal Challenges/Ability;
- 4) Topic 4: Time Management;
- 5) Topic 5: Easily Distracted;
- 6) Topic 6: Family Members/Make it Difficult; and
- 7) Topic 7: Lecturers.

Also presented in Table 4 is the topic coherence, which indicates the semantic interpretability of the terms used to describe a particular topic (Provalis Research, 2014), as well as the relative proportion pertaining to the text underlying each of these seven topics. In the following sections, the topics and themes extracted from Table 4 are presented, wherein the topics and terms are presented in boldface text and the theme[s] derived from these topics are presented in italics.

Table 4. Topics extracted from the responses delineating the challenges experienced by students at Stellenbosch University that hinder their ability to successfully learn online during the COVID-19 pandemic ($n = 1,982$).

No	Topic Labels	High Probability Terms	Coherence	Relative Proportion
1	Internet Connection	Internet; connection; slow; access; data; network; issues; connectivity; Internet connection; Internet access	.35	12.28
2	Mental Health	Health; mental; issues; mental health; mental health issues; stress; anxiety; depression; struggle; feeling	.32	6.41
3	Personal Challenges/Ability	Ability; hinder; online; learning; online learning; personal challenges; learn online; hinder my ability; ability to learn online; successfully learn online	.39	16.16
4	Time Management	Time; takes; difficult; long; hours; make; complete; time management; full time; part time	.33	26.11
5	Easily Distracted	Distracted; easily; focus; easily distracted; distracted easily; attention; disruption; distraction; noise; responsibility	.30	3.81
6	Family Members/Make it Difficult	Home; makes; difficult; study; room; space; working; environment; family members; makes it difficult	.32	20.40
7	Lecturers	Lecturers; contact; interaction; students; peers; lack; social; physical; online learning; face to face	.31	14.84

Table 4 indicates that **Time Management** (Topic 4) had the highest relative proportion of extracted statements (26.11%), with high-probability terms including *Time, takes, difficult, long, hours, make, complete, time management, full time, and part time*. This topic indicates that time management is central to the challenges experienced by students at Stellenbosch University that hinder their ability successfully to learn online during the COVID-19 pandemic. For many students, it was a challenge to balance their home lives and their academic lives—a balance that had changed as a result of learning online, as exemplified by the following account: “Time management played a role. Balancing home life and academic studies was difficult. If you’re going to campus, that’s one thing you focus on. In comparison at home, there are multiple distractions including family” (Woman, 25-35, full-time, local, postgraduate and honours student, Faculty of Education).

The Time Management topic was followed (20.40% of the extracted statements) by the **Family Members/Make it Difficult** topic (Topic 6), with high-probability terms such as *Home, makes, difficult, study, room, space, working, environment, family members, and makes it difficult*. This topic highlights the challenges that family members play in hindering their propensity of online learning. Examples of family members making it difficult for students to learn online include the following:

When you are working from home people think they can rely on you for everyday errands. This makes it difficult to focus. (Woman, 25-35, full-time, local, postgraduate and doctoral degree student, Faculty of Science)

My parents tend to break me down when I am at home a lot, and they make me feel as though I am never good enough. This makes it difficult to believe in myself enough to study hard for my subjects. (Woman, 18-24, full-time, local, undergraduate and Bachelor’s degree student, Faculty of Arts and Social Sciences)

Family issues sometimes makes it difficult to get good study as well as sleep time. (Woman, 18-24, full-time, local, undergraduate and Bachelor’s degree student, Faculty of Science)

Being interrupted by family members or pets who need something sometimes makes it difficult to focus on my work and causes me to fall behind. (Woman, 18-24, full-time, local, undergraduate and Bachelor’s degree student, Faculty of Economics and Management Sciences)

The next most frequent topic for the students (16.16% of the extracted statements) was **Personal Challenges/Ability** (Topic 3), with high-probability terms that include *Ability, hinder, online, learning, online learning, personal challenges, learn online, hinder my ability, ability to learn online, and successfully learn online*. This topic demonstrates that the issue of personal challenges discriminated students. Indeed, interestingly, a sentiment analysis revealed that, of the 29 students who directly used the phrase “personal challenges,” a significant proportion of them ($n = 11$; 37.9%) stated that they did not have any personal challenges. The following extracts provide examples of positive sentiments about personal challenges stated by these students:

I believe that adaptation is the key to any personal challenges you may face, there will always be obstacles along the way whether COVID-19 is present or not, it all depends on what you make of your situation. (Woman, 18-24, full-time, local, undergraduate and Bachelor's degree student, Faculty of Arts and Social Sciences)

I have no personal challenges that could hinder my learning. I am motivated and enthusiastic about my work. (Man, 18-24, full-time, local, undergraduate and Bachelor's degree student, Faculty of AgriSciences)

I am very comfortable with technology and therefore have no personal challenges to learn online. (Man, 36-45, part-time, local, undergraduate and Bachelor's degree student, Faculty of Military Sciences)

The next most frequent topic (14.84% of the extracted statements) for the students was **Lecturers** (Topic 7), with high-probability terms that include *Lecturers, contact, interaction, students, peers, lack, social, physical, online learning, and face to face*. This topic indicates that lecturers are a central focus of the students during the pandemic. The students described challenges that appeared to be particular to the online learning context, as opposed to the face-to-face learning context. In particular, compared to *face-to-face* learning, the reduction in direct *physical contact* and *interaction* with their lecturers and the inability to *socialize face-to-face* with *peers*, made online learning more of a challenge for the students, as exemplified by the following comments:

I have found that I need interaction with other students to cope. This was made more difficult throughout online learning. Asking questions is also not as natural and free as in class, where you can draw from another student's ideas or questions, as a reminder of something you're struggling with, too. (Woman, 18-24, full-time, local, postgraduate and Honours degree student, Faculty of Economic and Management Sciences)

Sometimes I need someone to brainstorm, ask questions to and bounce ideas off and I did not have that interaction with the other students during lockdown. (Man, 25-35, full-time, local, postgraduate and Master's degree student, Faculty of Engineering)

The inability to learn amongst others, with online learning the university experience felt very isolated. I missed interacting with other students and their interactions with lecturers in class. (Woman, 18-24, full-time, local, undergraduate and Bachelor's degree student, Faculty of Economic and Management Sciences)

I enjoy in-person contact and class room learning where I can engage with the lecturers and my peers face-to-face. This has not been possible and I am often rather fatigued by yet another online session where there is no true interaction except with hesitant voices on the other side of switch-off video screens. This has dampened my enthusiasm to study and turned it into a task that I would rather postpone if possible. (Man, 36-45, part-time, local, undergraduate and Bachelor's degree student, Faculty of Military Sciences)

I love my classroom environment. I miss the class discussions and the human contact and interactions we had which made me look forward to every lecture. (Woman, 18-24, full-time, local, undergraduate and Bachelor's degree student, Faculty of Education)

The lack of interaction and willingness to assist students from some lecturers made online learning difficult. Additionally, lecturers taking days to respond to queries also hindered the online learning process. Some lecturers just never responded to questions asked on online class forums or via email. (Woman, 18-24, full-time, local, undergraduate and Bachelor's degree student, Faculty of Science)

Limited social interaction that often provides emotional and mental relief from university work is lacking. Collaboration between students and friends is my favorite part of university learning, and this is currently missing. (Woman, 18-24, full-time, local, postgraduate and Honours degree student, Faculty of Economics and Management Sciences)

I struggle to focus and really need interaction with students and lecturers. My marks are not what it's supposed to be because of online learning and no support from lecturers. (Woman, 18-24, full-time, local, undergraduate and Bachelor's degree student, Faculty of Economics and Management Sciences)

It's a little nerve wracking to post your question publicly for all others to see, no class mate interaction/meeting new people hinders the learning experience because the corridor conversations no longer take place which used to be where about a third of my learning would occur due to the high efficacy of trouble shooting with people in the same boat as you. (Woman, 18-24, full-time, local, undergraduate and Bachelor's degree student, Faculty of Engineering)

I crave personal interaction. I tend to learn better when exchanging theories, ideas, resources, etc. with others. Being around people that are working toward a similar goal, encourages me and I am not exposed to this when at home. Online learning feels impersonal and almost not as significant as studying would feel at university (in person). (Woman, 18-24, full-time, local, undergraduate and Bachelor's degree student, Faculty of Economics and Management Science)

The next most frequent topic (12.28% of the extracted statements) for the students was **Internet Connection** (Topic 1), with high-probability terms that include *Internet, connection, slow, access, data, network, issues, connectivity, Internet connection, and Internet access*. This topic indicates that access to the Internet is central to the online learning process for these students. The Internet-related problems experienced by students is exemplified by the following excerpts:

I think because I live in a small town like Stilbaai, the Internet isn't that fast as in Stellenbosch. That is sometimes a cause for concern because it takes a while to upload. (Man, 18-24, full-time, local, undergraduate and Bachelor's degree student, Faculty of Engineering)

At certain times loadshedding would also cause our internet to go down as well as disrupting my cell phone service and thus mobile data would also not really work; therefore I was not able to sufficiently participate in my online studies at those times. (Woman, 18-24, full-time, local, undergraduate and Bachelor's degree student, Faculty of Science)

The next most frequent topic (6.41% of the extracted statements) for the students was **Mental Health** (i.e., Topic 2), with high-probability terms that include *Health, mental, issues, mental health, mental health issues, stress, anxiety, depression, struggle, and feeling*. This topic indicates that the students' affective needs are an essential consideration within the online learning context. For some students, their mental health issue stemmed directly from the lockdown itself. For other students who mentioned having mental health challenges, their online learning context either brought on mental health issues or exacerbated existing ones. The latter is exemplified by the following statements:

The pandemic has affected my mental health negatively. This has made it increasingly difficult for me to concentrate on my studies. (Woman, 18-24, full-time, local, undergraduate and Bachelor's degree student, Faculty of Medicine and Health Sciences)

I also battle with depression and anxiety, so the adaptation from contact lectures to online learning posed a major threat to my mental health. This caused me to look for reasons to procrastinate doing work because I could not easily adapt to the change in my routine, which then caused me to panic about being behind in work. (Woman, 18-24, full-time, local, undergraduate and Bachelor's degree student, Faculty of Medicine and Health Sciences)

I work every day, all day with my university work, which means I have no release, which impacts my mental health and thereby can make my online learning less enjoyable and very draining. (Man, 18-24, full-time, local, undergraduate and Bachelor's degree student, Faculty of Arts and Social Sciences)

Online learning takes a lot more time and admin than going to class. It also feels like a lot more work and is definitely more challenging and difficult, especially the tests. The amount of work makes it difficult to keep up and you feel constantly behind, whether its admin or other work. It can affect your mental health quite a bit because you feel like you can never rest, as there is always more work to do, a seminar to listen to, an assignment to complete. (Woman, 18-24, full-time, local, postgraduate and Honours degree student, Faculty of Law)

The university did not make mental health and wellbeing facilities and support available and approachable enough, those that were available were sub-par and unreliable at best- they did not help. The university either did not respond or react to student suggestions or please, the rare few responses gotten a worrying amount were aggressive and attacking the students making derogatory claims about our study-ethics and commitment. Most of the above was especially prevalent in the undergraduate physics department. The University of Stellenbosch has disappointed its students and not committed to its own mission. (Man, 18-24, full-time, local, undergraduate and Bachelor's degree student, Faculty of Science)

Anxiety and Depression often affects my ability to learn successfully. I am often sidetracked when I do find myself alone, thus, if I am able to, I would prefer being surrounded by people, even by keeping distance. I do admit, online learning is quite challenging. (Woman, 18-24, full-time, local, undergraduate and Bachelor's degree student, Faculty of Theology)

Disturbingly, almost every comment relating to this topic of mental health was negative in nature. Even more alarmingly, two students mentioned suicide ideation:

I have been diagnosed with general anxiety and was very suicidal at the mid stage of this year. Two people died in the middle of the year and I assume they committed suicide. There is certain horrible lecturers that treated the students disgustingly during this hard time and I'm sure it is their fault. There emotional intelligence is too inept to even have a smudge of empathy and thus the evaluate the students in a disgusting unfair matter, and because of this stress in student sky rockets and they just refuse to communicate or alter their disgusting way of evaluating their students. (Man, 18-24, full-time, local, undergraduate and Honours degree student, Faculty of Science)

Severe Depression and suicidal thoughts. (Woman, 18-24, full-time, local, undergraduate and Bachelor's degree student, Faculty of Economics and Management Science)

Unfortunately, because the questionnaire in the current investigation was completed anonymously by the students, as researchers, we were unable to intervene with these students by reaching out to them and referring them to counseling services and the like.

The final topic (3.81% of the extracted statements) was **Easily Distracted** (i.e., Topic 5), with high-probability terms that include *Distracted, easily, focus, easily distracted, distracted easily, attention, disruption, distraction, noise, and responsibility*. This topic indicates that the ability to focus on their learning was an important challenge, as exemplified by the following:

Concentration is also a bit more challenging as there are more distractions (noise from the rest of the household, online distractions having to sit for hours on end and not moving to different locations etc.). (Woman, 18-24, full-time, local, undergraduate and Bachelor's degree student, Faculty of Economics and Management Science)

The environment I live in really distracts me from studying and the internet connection is very bad. (Woman, 18-24, full-time, local, undergraduate and Bachelor's degree student, Faculty of Science)

The environment at home, it is hard to focus or get work done when you're constantly distracted by family members and neighbors. I think it is harder for family members to grasp the fact that working at home is a lot harder than working on campus. Often my family members think I don't have any work unless I'm constantly sitting with my laptop. (Woman, 25-35, full-time, local, postgraduate and Master's degree student, Faculty of AgriScience)

Emergent Analysis

The emergence of seven themes related to challenges experienced by students at Stellenbosch University that hinder their ability successfully to learn online during the COVID-19 era via the WordStat topic modeling led to the identification of eight emergent research questions, which, as Plano Clark and Badiie (2010) defined, refer to new or modified research questions that come to the fore during the design, data collection, data analysis, and/or interpretation phase. Specifically, the following eight mixed methods research questions arose during the data analysis phase:

1. What is the affective state underlying the challenges experienced by students at Stellenbosch University that hinder their ability to successfully learn online during the COVID-19 era?
2. What is the most prevalent challenge experienced by students at Stellenbosch University that hinder their ability to successfully learn online during the COVID-19 era?
3. What is the level of concentration among the seven emergent themes?
4. What is the underlying structure of the seven emergent themes?
5. What demographic variables are associated with the seven emergent themes?
6. What demographic variables are associated with the highest number of emergent themes?
7. What narrative profile formation underlies these seven themes?
8. To what extent are the emergent themes related to certain geographic locations?

These emergent research questions were addressed using one of the following three classes of quantization identified by Onwuegbuzie (in press): descriptive-based quantizing, exploratory-based quantizing, and inferential-based quantizing (see also Onwuegbuzie & Johnson, 2021). According to Onwuegbuzie (in press), descriptive-based quantizing involves the use of descriptive analyses, which is characterized by one of the following four measures: measures of central tendency, measures of variation/dispersion, measures of position/relative standing, and measures of distributional shape. Contrastingly, exploratory-based quantizing involves the quantizing of qualitative data for the purpose of identifying group membership, wherein the grouping could be participants or variables (e.g., themes, words). Finally, inferential-based quantizing involves the quantizing of qualitative data for the purpose of estimation or prediction (Onwuegbuzie, in press). Findings from each of these classes of quantization are presented in the ensuing sections.

Descriptive-Based Quantizing

What is the Affective State Underlying the Challenges Experienced by Students at Stellenbosch University that Hinder Their Ability Successfully to Learn Online during the COVID-19 Era? According to Onwuegbuzie and Johnson (2021), descriptive-based quantizing involves the use of descriptive analyses to convert qualitative data—in this case, the seven emergent themes—into numerical codes that can be analysed statistically. In this phase of the mixed methods analysis, descriptive-based quantizing took the form of conducting a sentiment analysis, which refers to conducting a text analysis to identify, to extract, to quantize, and to interpret affective/emotional states—in this case, to classify the polarity of statements about the challenges experienced by students at Stellenbosch University that hinder their ability successfully to learn online during the COVID-19 era into positive and negative sentiments.

The descriptive-based quantizing of the students' statements revealed that, of the 1,932 participants, 10.6% indicated positive sentiments associated with the challenges that they experienced. Of these 205 students, the vast majority of students (95.1%) stated that they had not experienced any challenges, with the remaining stu-

dents—representing 0.5% of the total sample—indicating that they actually benefitted from online learning during the COVID-19 era, as exemplified by the following statements:

As an introvert I feel much more comfortable with online teaching, less stress and agony. (Man, 18-24, full-time, local, undergraduate and Bachelor's degree student, Faculty of Arts and Social Sciences)

I enjoy online learning. (Woman, 18-24, full-time, local, undergraduate and Bachelor's degree student, Faculty of Education)

I enjoy learning from home. I am close to my family and I know they are safe. (Man, 18-24, full-time, local, postgraduate and Master's degree student, Faculty of Arts and Social Sciences)

Online studies have allowed me to manage my OCD [Obsessive–compulsive disorder] and ADHD [attention deficit hyperactivity disorder] by setting my own hours and times. I've been able to take mental breaks when I needed them and it's helped a lot for my anxiety. (Woman, 18-24, full-time, local, undergraduate and Bachelor's degree student, Faculty of Science)

What is the Most Prevalent Challenge Experienced by Students at Stellenbosch University that Hinder Their Ability Successfully to Learn Online during the COVID-19 Era? An inter-respondent matrix (Onwuegbuzie, 2003; see also Onwuegbuzie & Teddlie, 2003) of themes was developed whereby each emergent theme was quantized such that the number of times that each student participant made a statement that was classified under that theme was tallied—yielding a *participant × theme matrix* that consisted of frequency counts. From this matrix, the mean frequency of each theme was computed, which served as manifest effect sizes (i.e., effect sizes that pertain to observable content; Onwuegbuzie, 2003). Table 5 presents these manifest effect sizes. It can be seen from these manifest effect sizes that Personal Challenges/Ability was the most prevalent theme, with nearly one third (i.e., .29) presenting challenges that were categorized under this theme. This theme was followed by Family Members/Make it Difficult, with a 25% prevalence rate. Although Mental Health had the lowest prevalence rate, bearing in mind that many of the sentiments captured by this theme were disturbing—such as revealing suicide ideation—12% represents a significant effective size.

Table 5. Manifest effect size and standard deviation of each and emergent theme.

Theme	Mean Frequency (i.e., Manifest Effect Size)	SD
Internet Connection	.207	.41
Mental Health	.123	.33
Personal Challenges/Ability	.295	.46
Time Management	.145	.35
Easily Distracted	.208	.41
Family Members/Make it Difficult	.252	.43
Lecturers	.225	.42

The inter-respondent matrix also revealed that the number of themes per participant ranged from 0 to 5 ($M = 1.59$, $SD = 0.81$). The highest proportion of participants contributed to one theme ($n = 893$). This was followed, respectively, by two themes ($n = 574$), and then three themes ($n = 172$), four themes ($n = 37$), and five themes ($n = 5$).

What is the Level of Concentration among the Seven Emergent Themes? Onwuegbuzie (2021a) advocated the use of the Herfindahl-Hirschman Index for evaluating the distribution of themes—in this case, the distribution of the seven emergent themes—specifically, the concentration index. This index commonly is used to measure the level of concentration in a given industry as an indicator of market competition.

$$H = \sum_{i=1}^n t_i^2$$

where t_i is the share of theme i in the market, and n is the number of themes. The Herfindahl Index (H) ranges from $1/n$ to 1, where N is the number of emergent themes. Alternatively, if percentages are used as whole numbers (e.g., 33 instead of 0.33), the index can range up to 10,000 (i.e., 100^2). Using the criteria of U.S. Department of Justice and the Federal Trade Commission (2010),

- An H below 0.01 (or 100) indicates an (approximately) equally distributed frequency of themes
- An H below 0.15 (or 1,500) indicates an unconcentrated set of themes.
- An H between 0.15 to 0.25 (or 1,500 to 2,500) indicates moderate concentration.
- An H above 0.25 (above 2,500) indicates high concentration.

Therefore, for example, when a total of two themes are involved that each have an effect size (i.e., prevalence rate) of 50%, the Herfindahl-Hirschman Index equals $0.50^2 + 0.50^2 = 0.50$, which indicates a high concentration of the themes. Table 6 presents the frequencies pertaining to the Herfindahl-Hirschman Index for the seven themes. It can be seen from this table that whereas the thematic responses of only 2.5% of the sample members represented a moderate concentration, the remaining 97.5% of the participants yielded thematic responses that represented a high concentration. This indicated that the experiences of the overwhelming majority of participants were characterized by an unequal distribution of challenges.

Table 6. Frequency distribution of Herfindahl-Hirschman Index pertaining to the seven emergent themes.

Herfindahl-Hirschman Index	f	%
.20	5	0.3
.25	37	2.2
.33	172	10.3
.50	574	34.4
1.00	883	52.8
Total	1,671	100.0

Onwuegbuzie (2021a) also advocated the use of the Four-Firm Concentration Ratio for evaluating the distribution of themes. This index commonly is used to measure the level of concentration in a given industry as an indicator of market competition. The formula for determining the Four-Firm Concentration Ratio is as follows:

$$CR4 = (T_1 + T_2 + T_3 + T_4) / T$$

where T is the total number of themes of a participant and T_i is the i th theme that represents one of the four themes with the largest effect sizes. Accordingly, the higher the effect size (expressed as a percentage) of these four largest themes, the more concentrated the ratio. Specifically, a ratio in the range of 0% to 50% is considered to have a low concentration and the themes to be well distributed. Ratios in the range from above 50% to 80% are moderately distributed, and anything larger than 80% is approaching a monopoly in the distribution of themes, in which one theme is dominant. Table 7 presents the frequencies pertaining to the Four-Firm Concentration Ratio involving the four most prevalent themes. It can be seen from this table that statements made by 42.3% of the participants yielded themes with a low concentration, statements made by 8.2% of the participants yielded themes with a moderate concentration, and statements made by 49.5% of the participants yielded themes with a high concentration.

Table 7. Frequency distribution of the four-firm concentration ratio pertaining to the emergent themes.

Four-Firm Concentration Ratio	Mean Frequency	%
0%	383	22.8
33%	24	1.4
50%	302	18.0
60%	4	0.2
67%	114	6.8
75%	19	1.1
80%	1	0.1
100%	831	49.5

Exploratory-Based Quantitizing

What is the Underlying Structure of the Seven Emergent Themes? Both a principal components analysis (PCA) and exploratory factor analysis (EFA) were conducted in order to assess the dimensionality of the seven emergent themes. With respect to the PCA, the anti-image correlation matrix revealed that all KMO values for the items well exceeded the acceptable limit of .5 (Field, 2018)—with all values exceeding .85. Also, Bartlett's test of sphericity indicated that the correlations between the items were sufficiently large to justify for the PCA, $\chi^2(21) = 589.13, p < .0001$.

Both the eigenvalue-greater-than-one rule (i.e., K1; Kaiser, 1958) and scree test (Cattell, 1966) (not presented) suggested that four factors be retained. This four-factor solution was confirmed by a follow-up parallel analysis, which provided the third criteria (i.e., multiple methods) for identifying the number of factors to retain. As concluded by Thompson (2004), "parallel analysis appears to be among the best methods for deciding how many factors to extract or retain" (p. 34).

Because PCA does not involve the use of *p* values—and thus Type I error is not an issue—both an orthogonal rotation and an oblique rotation (i.e., representing multiple methods approaches; Onwuegbuzie & Hitchcock, 2019b) were conducted, which enabled both sets of solutions to be compared and contrasted. These comparisons revealed that (a) the pattern/structure matrix stemming from the varimax (i.e., orthogonal) rotation and both (b) the pattern matrix and (c) the structure matrix stemming from the direct oblimin (i.e., oblique) rotation with a delta value of zero (i.e., direct quartimin rotation; Field, 2018) yielded very similar matrices. However, due to space constraints, only the pattern/structure matrix stemming from the varimax is provided (see Table 8). Therefore, the interpretation of the four-component solution was clear. Specifically, using a cutoff correlation of .4 identified by Henson et al. (2004) as the median value used in the literature for pattern/structure coefficients, all three matrices revealed that Factor 1 (2 themes) explained 19.29% of the variance, Factor 2 (2 themes) explained 17.90% of the variance, Factor 3 (2 themes) explained 15.84% of the variance, and Factor 4 (1 theme) explained 15.58% of the variance. These four factors combined to explain 68.61% of the total variance, which is much larger than that typically explained in factor solutions (i.e., $M = 44.92\%$, $SD = 16.55\%$, Range = 12.80% to 70.20%; Henson & Roberts, 2006), and which represents a very large effect size. Factor 1 contained the Family Members/Make it Difficult theme and the Easily Distracted theme, which suggested a meta-theme that we entitled as *Home-Related Challenges*. Factor 2 contained the Internet Connection theme and the Personal Challenges/Ability theme, which suggested a meta-theme that we entitled as *Connectivity and Personal Challenges*. Factor 3 contained the Time Management time and Lecturers theme, which suggested a meta-theme that we entitled as *Academic-Related Challenges*. Finally, Factor 4 contained the Mental Health theme, which we relabeled as a *Mental Health meta-theme*. In summary, the seven themes mapped onto four meta-themes. In terms of manifest effect sizes, the most prevalent meta-theme was *Connectivity and Personal Challenges* (43.8%), followed, respectively, by *Home-Related Challenges* (36.5%), *Academic-Related Challenges* (34.9%), and *Mental Health* (12.3%).

Table 8. Pattern/structure coefficients from principal component analysis (varimax): Four-factor solution.

Variable	1	2	3	4	Communality Coefficient
Family Members/Make it Difficult	.77	-.10	-.03	.08	.61
Easily Distracted	.74	.12	.07	-.16	.59
Internet Connection	-.15	-.87	-.01	-.24	.83
Personal Challenges/Ability	-.22	.55	.06	-.42	.53
Time Management	-.15	.22	.82	-.07	.75
Lecturers	-.34	.32	-.65	-.05	.64
Mental Health	-.12	.10	-.02	.91	.85
Trace	1.35	1.25	1.11	1.09	4.80
% variance explained	19.29	17.90	15.84	15.58	68.61

Note: Coefficients in bold represent pattern coefficients with the largest effect size within each theme using a cut-off value of 0.4 identified by Henson et al. (2004) as the median value used in the literature.

Inferential-Based Quantitizing

What Demographic Variables are Associated with the Seven Emergent Themes? A canonical correlation analysis was undertaken to examine the relationship between the five demographic variables (i.e., gender [men vs. women]; age group [18-24 vs. ≥ 25]; level of student [i.e., undergraduate vs. postgraduate]; locality status [i.e., local vs. international student]; and registration status [i.e., full-time vs. part-time]) and the seven themes. The seven themes were treated as the dependent variables, whereas the five demographic variables served as the independent variables.

This analysis revealed that the five canonical correlations combined were statistically significant ($F[35, 8430] = 4.68, p < .0001$; Canonical $R_{c1} = .23$). When the first canonical root was excluded, the remaining canonical roots were statistically significant ($F[24, 5872.50] = 2.99, p < .0001$; Canonical $R_{c2} = .15$). Similarly, when the first and second canonical roots were excluded, the remaining canonical roots were statistically significant ($F[15, 4649.18] = 2.17, p = .006$; Canonical $R_{c2} = .12$). In contrast, when the first, second, and third canonical roots were excluded, the remaining canonical roots were not statistically significant ($F[8, 3370.00] = 0.18, p = .62$; Canonical $R_{c2} = .05$). Finally, when the first four canonical roots were excluded, the remaining canonical root was not statistically significant ($F[3, 1686.00] = 0.47, p = .71$; Canonical $R_{c2} = .03$). Together, these results suggested that the first three canonical functions were statistically significant and practically significant (Cohen, 1988), but the fourth and fifth roots were not statistically significant.

Data pertaining to the first canonical root are presented in Table 9, which provides both standardized function coefficients and structure coefficients. Using a cutoff correlation of 0.3 (Lambert & Durand, 1975), the standardized canonical function coefficients revealed that age group, locality status, and registration status made important contributions to the prediction of emergent themes—with age group making by far the biggest contribution. With respect to the emergent theme set, Internet Connection, Mental Health, and Lectures made noteworthy contributions—with all of them making approximately equal contributions. The structure coefficients pertaining to the first canonical function revealed that age group, locality status, and registration status made important contributions (i.e., were practically significant), with age group, again, making by far the largest contribution. With regard to the emergent theme cluster, Internet Connection, Mental Health, and Lectures made approximately equal contributions. Comparing the standardized coefficients and the structure coefficients identified level of student as being collinear within the demographic set, and Time Management being collinear within the emergent theme set, because the standardized coefficient associated with these variables was small, whereas the corresponding structure coefficients were relatively large (Onwuegbuzie & Daniel, 2003). Overall, the canonical correlation solution for the first canonical function indicated that the multivariate relationship was mostly characterized by the relationship between age group, locality status, and registration status on the demographic side and Internet Connection, Mental Health, and Lectures on the emergent themes set. More specifically, the youngest students, local students, and full-time students were more likely to experience challenges associated with Internet connectivity and less likely to experience challenges associated with mental health and online lectures.

Table 9. Canonical solution for first function: Relationship between the five demographic variables and the seven emergent themes.

Variable	Standardized Coefficient	Structure Coefficient	Structure ² (%)
<i>Demographic:</i>			
Gender	-.13	-.21	4.4
Age group	.71*	-.86*	74.0
<i>Level of student</i>	-.18	.52*	27.0
Locality status	.39*	.55*	30.3
Registration status	.35*	.68*	46.2
<i>Emergent Themes:</i>			
Internet Connection	.45*	.60*	36.0
Mental Health	-.51*	-.55*	30.3
Personal Challenges/Ability	-.02	-.01	0.1
<i>Time Management</i>	.27	.33*	10.9
Easily Distracted	-.28	-.21	4.4
Family Members/Make it Difficult	-.20	-.15	2.3
Lecturers	-.52*	-.53*	28.1

Note: *Practically significant coefficients with the effect sizes larger than .3 (Lambert & Durand, 1975). Variables that are bolded have both a standardized coefficient and a structure coefficient that are practically significant; variables that are italicised but not bolded have either a standardized coefficient or a structure coefficient that is practically significant; and variables that are neither bolded nor italicised (i.e., normal font) have a non-practically significant standardized coefficient and a non-practically significant structure coefficient.

Data pertaining to the second canonical root are presented in Table 10, which provides both standardized function coefficients and structure coefficients. Again, using a cutoff correlation of 0.3 (Lambert & Durand, 1975), the standardized canonical function coefficients revealed that gender made an important contribution to the prediction of emergent themes. With respect to the emergent theme set, Mental Health and Family Members/Make it Difficult made noteworthy contributions—with Mental Health making by far the biggest contribution. The structure coefficients pertaining to the second canonical function revealed that gender made an important contribution. With regard to the emergent theme cluster, Mental Health and Family Members/Make it Difficult made important contributions, with Mental Health again making the biggest contribution. Comparing the standardized coefficients and the structure coefficients identified Lecturers as being collinear within the emergent theme set because the standardized coefficient associated with these variables was small, whereas the corresponding structure coefficients were relatively large (Onwuegbuzie & Daniel, 2003). In contrast, age group and level of student from the demographic set and Internet Connection, Personal Challenges/Ability, and Time Management from the emergent theme set each served as a suppressor variable because, for each of these variables, the structure coefficient associated was small, whereas the corresponding standardized coefficient was relatively large (Onwuegbuzie & Daniel, 2003). Suppressor variables are variables that assist in the prediction of the variables in the other set due to their correlation with other variables in their own set (Onwuegbuzie & Daniel, 2003). Overall, the canonical correlation solution for the second canonical function indicated that the multivariate relationship was mostly characterized by the relationship between gender on the demographic side and Mental Health and Family Members/Make it Difficult on the emergent themes set. More specifically, women students were more likely to experience challenges associated with both mental health and family members.

Table 10. Canonical solution for second function: Relationship between the five demographic variables and the seven emergent themes.

Variable	Standardized Coefficient	Structure Coefficient	Structure ² (%)
<i>Demographic:</i>			
Gender	-.96*	-.93*	86.5
<i>Age group</i>	-.32*	-.04	0.2
<i>Level of student</i>	.45*	.18	3.2
Locality status	-.16	-.10	1.0
Registration status	-.11	-.07	0.5
<i>Emergent Themes:</i>			
<i>Internet Connection</i>	-.47*	.25	6.3
Mental Health	-.76*	-.60*	36.0
<i>Personal Challenges/Ability</i>	-.37*	-.16	2.6
<i>Time Management</i>	-.39*	-.24	5.8
Easily Distracted	.11	.11	1.2
Family Members/Make it Difficult	-.54*	-.39*	15.2
<i>Lecturers</i>	.12	.34*	11.6

Note: *Practically significant coefficients with the effect sizes larger than .3 (Lambert & Durand, 1975). Variables that are bolded have both a standardized coefficient and a structure coefficient that are practically significant; variables that are italicised but not bolded have either a standardized coefficient or a structure coefficient that is practically significant; and variables that are neither bolded nor italicised (i.e., normal font) have a non-practically significant standardized coefficient and a non-practically significant structure coefficient.

Data pertaining to the third canonical root are presented in Table 11, which provides both standardized function coefficients and structure coefficients. Once more, using a cutoff correlation of 0.3 (Lambert & Durand, 1975), the standardized canonical function coefficients revealed that level of student and locality status made important contributions to the prediction of emergent themes—with level of student making the biggest contribution. With respect to the emergent theme set, Personal Challenges/Ability, Time Management, and Easily Distracted made noteworthy contributions—with all of them making approximately equal contributions. The structure coefficients pertaining to the third canonical function revealed that level of student and locality status made important contributions, with level of student, again, making the largest contribution. With regard to the emergent theme cluster, Personal Challenges/Ability, Time Management, and Easily Distracted made approximately equal contributions. Comparing the standardized coefficients and the structure coefficients identified age group and registration status as being collinear within the demographic set and Internet Connection and Time Management being collinear within the emergent theme set because the standardized coefficient associated with these variables was small, whereas the corresponding structure coefficients were relatively large (Onwuegbuzie & Daniel, 2003). Overall, the canonical correlation solution for the third canonical function indicated that the multivariate relationship was mostly characterized by the relationship between level of student and locality status on the demographic side and Personal Challenges/Ability, Time Management, and Easily Distracted on the emergent themes set. More specifically, undergraduate students and local students were more likely to experience challenges associated with personal challenges, time management, and being easily distracted.

Table 11. Canonical solution for third function: Relationship between the five demographic variables and the seven emergent themes.

Variable	Standardized Coefficient	Structure Coefficient	Structure ² (%)
<i>Demographic:</i>			
Gender	-.21	-.26	6.8
<i>Age group</i>	.13	-.34*	11.6
Level of student	-.76*	-.67*	44.9
Locality status	.67*	-.60*	36.0
<i>Registration status</i>	-.20	-.43*	18.5
<i>Emergent Themes:</i>			
<i>Internet Connection</i>	.11	.31*	9.6
<i>Mental Health</i>	.27	.42*	17.6
Personal Challenges/Ability	-.56*	-.54*	29.2
Time Management	-.51*	-.51*	26.0
Easily Distracted	-.46*	-.47*	22.1
Family Members/Make it Difficult	-.28	-.22	4.8
Lecturers	-.21	-.04	0.2

Note. *Practically significant coefficients with the effect sizes larger than .3 (Lambert & Durand, 1975). Variables that are bolded have both a standardized coefficient and a structure coefficient that are practically significant; variables that are italicised but not bolded have either a standardized coefficient or a structure coefficient that is practically significant; and variables that are neither bolded nor italicised (i.e., normal font) have a non-practically significant standardized coefficient and a non-practically significant structure coefficient.

As a follow-up to the canonical correlation analysis, a series of Fisher's Exact Tests was conducted to determine the relationship between the seven emergent themes and the select demographic variables. The Bonferroni adjustment (Chandler, 1995; Ho, 2006; Manly, 2004; Vogt, 2005) was used to ensure that the familywise error rate did not exceed 5% (i.e., adjusted $\alpha = .05/7$ themes = .007). Figure 1 presents the demographic variables that are statistically significant predictors of each theme. To summarize Figure 1,

- The Internet Connection theme was predicted by the following three demographic variables: age group, locality status, and registration status.
- The Mental Health theme was predicted by the following four demographic variables: gender, age group, level of student, and registration status.
- The Personal Challenges/Ability theme did not have any statistically significant predictors.
- The Time Management theme was predicted by the following three demographic variables: age group, level of student, and registration status.
- The Easily Distracted theme was predicted by the following demographic variable: locality status.
- The Family Members/Make it Difficult theme was predicted by the following two demographic variables: gender and registration status.
- The Lecturers theme was predicted by the following four demographic variables: age group, level of student, locality status, and registration status.

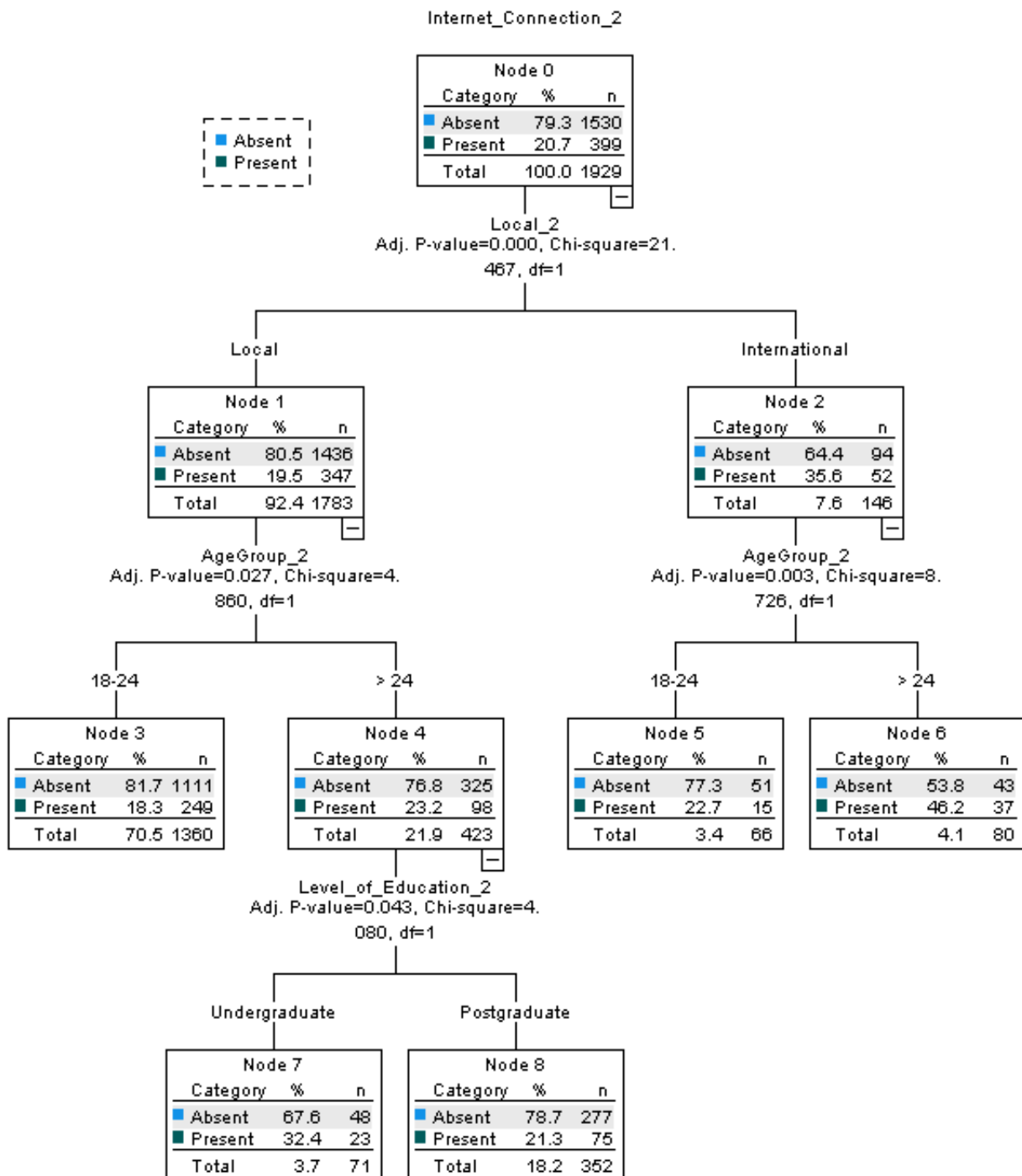
Figure 1. Demographic variables that are statistically significant predictors of each theme.

Theme	Finding
Internet Connection	<p>AGE GROUP: Students older than 24 years of age are 1.61 times (95% confidence interval [CI] = 1.27, 2.05) more likely than are students in the 18-24 age group to indicate problems associated with Internet connectivity.</p> <p>LOCALITY: International students are 2.29 times (95% CI = 1.60, 3.28) more likely than are local students to indicate problems associated with Internet connectivity.</p> <p>REGISTRATION: Part-time students are 1.50 times (95% CI = 1.08, 2.09) more likely than are Full-time students to indicate problems associated with Internet connectivity.</p>
Mental Health	<p>GENDER: Female students are 1.83 times (95% CI = 1.35, 2.47) more likely than are male students to indicate problems associated with mental health.</p> <p>AGE GROUP: Students in the 18-24 age group are 1.73 times (95% CI = 1.73, 3.57) more likely than are students older than 24 years of age to indicate problems associated with mental health.</p> <p>LEVEL OF STUDENT: Undergraduate students are 2.02 times (95% CI = 1.51, 2.72) more likely than are postgraduate students to indicate problems associated with mental health.</p> <p>REGISTRATION: Full-time students are 3.98 times (95% CI = 1.90, 8.36) more likely than are Part-time students to indicate problems associated with mental health.</p>
Personal Challenges/Ability	No statistically significant predictors
Time Management	<p>AGE GROUP: Students older than 24 years of age are 1.47 times (95% CI = 1.12, 1.94) more likely than are students in the 18-24 age group to indicate problems associated with time management.</p> <p>LEVEL OF STUDENT: Postgraduate students are 1.38 times (95% CI = 1.06, 1.80) more likely than are undergraduate students to indicate problems associated with time management.</p> <p>REGISTRATION: Part-time students are 1.92 times (95% CI = 1.35, 2.73) more likely than are Full-time students to indicate problems associated with time management.</p>
Easily Distracted	LOCALITY: Local students are 1.76 times (95% CI = 1.10, 2.81) more likely than are International students to indicate problems associated with being easily distracted.
Family Members/Make it Difficult	<p>GENDER: Female students are 1.36 times (95% CI = 1.10, 1.69) more likely than are male students to indicate problems associated with family members.</p> <p>REGISTRATION: Full-time students are 1.32 times (95% CI = 0.51, 1.05) more likely than are Part-time students to indicate problems associated with family members.</p>
Lecturers	<p>AGE GROUP: Students in the 18-24 age group are 1.66 times (95% CI = 1.33, 2.06) more likely than are students older than 24 years of age to indicate problems associated with the online lecturer format.</p> <p>LEVEL OF STUDENT: Undergraduate students are 1.17 times (95% CI = 0.99, 1.39) more likely than are postgraduate students to indicate problems associated with the online lecturer format.</p> <p>LOCALITY: Local students are 1.83 times (95% CI = 1.15, 2.89) more likely than are International students to indicate problems associated with the online lecturer format.</p> <p>REGISTRATION: Full-time students are 1.93 times (95% CI = 1.31, 2.86) more likely than are Part-time students to indicate problems associated with the online lecturer format.</p>

A series of Chi-Square Automatic Interaction Detection (CHAID) analyses was conducted to explore further the demographic predictors of each of the seven themes. The CHAID analysis is a tree-based segmentation technique that is used to determine statistically significant segments that yield a predictive model or tree (Kass, 1980). Specifically, statistical algorithms are used to obtain segments that represent statistically significant predictors of the dependent variable. Conveniently, results are displayed in a hierarchical form that represents the variable that is the best predictor of the dependent variable, followed by the variable that is the next best predictor, and so on, until all statistically significant predictors have been represented. These hierarchical displays appear as classification trees (Hand et al., 2001; Magidson, 1994). As described by Collins (2021), CHAID

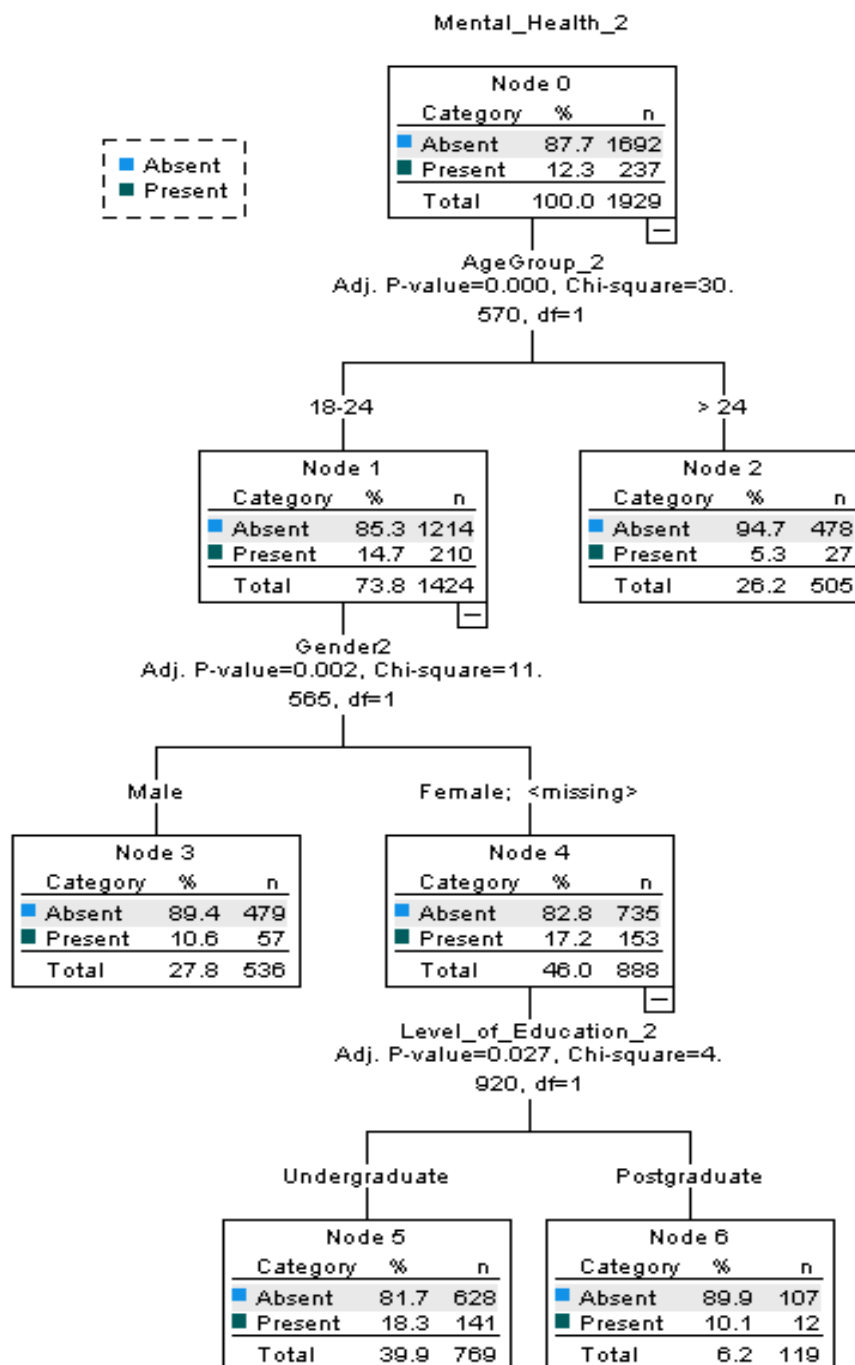
can be used to analyse qualitative data within a mixed analysis framework after the qualitative data have been quantitized.

Each of the seven emergent themes, in turn, served as the dependent variable to determine which of the five demographic variables used in the canonical correlation analyses, if any, were statistically significant predictors. Interestingly, the CHAID analysis revealed no demographic variables that were statistically significant predictors of the Personal Challenges/Ability theme. This is consistent with the Fisher's Exact Test finding for this theme. In contrast, statistically significant predictors were identified for the remaining six emergent themes. Specifically, as can be seen in Figure 2, the percentage of students who discussed the Internet Connection theme was 20.7% ($n = 399$) versus 79.3% ($n = 1,530$) who did not discuss this theme. The best predictor of this theme was locality status ($\chi^2[1] = 21.47$, adjusted $p < .0001$), with international students (35.6%, $n = 52$) being statistically significantly more likely to mention this theme than were local students (19.5%, $n = 347$). Age was the next best predictor. Among local students, those who were older than 24 years (23.2%, $n = 98$) were statistically significantly more likely ($\chi^2[1] = 4.86$, adjusted $p = .027$) to mention this theme than were students in the 18-24 age group (18.3%, $n = 249$). Similarly, among international students, those who were older than 24 years (45.2%, $n = 37$) were statistically significantly more likely ($\chi^2[1] = 8.73$, adjusted $p = .003$) to mention this theme than were students in the 18-24 age group (22.7%, $n = 15$). Level of education was the final predictor of the Internet Connection theme. Among local students who were older than 24, undergraduate students (32.4%, $n = 23$) were statistically significantly more likely ($\chi^2[1] = 4.08$, adjusted $p = .04$) to mention this theme than were postgraduate students (21.3%, $n = 75$). This model resulted in a good classification accuracy of approximately 79.3% of the sample (i.e., risk estimate = .207).

Figure 2. Demographic predictors of the Internet connection theme identified via the CHAID analysis.

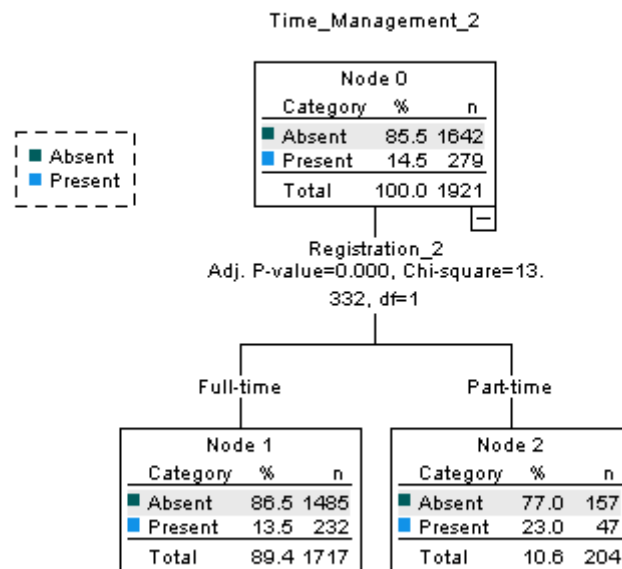
final predictor of the Mental Health theme. Among women students in the 18-24 age group, undergraduate students (18.3%, $n = 141$) were statistically significantly ($\chi^2[1] = 4.92$, adjusted $p = .003$) more likely to mention this theme than were men students (10.1%, $n = 12$). This model resulted in an excellent classification accuracy of approximately 87.7% of the sample (i.e., risk estimate = .123).

Figure 3. Demographic predictors of the mental health theme identified via the CHAID analysis.

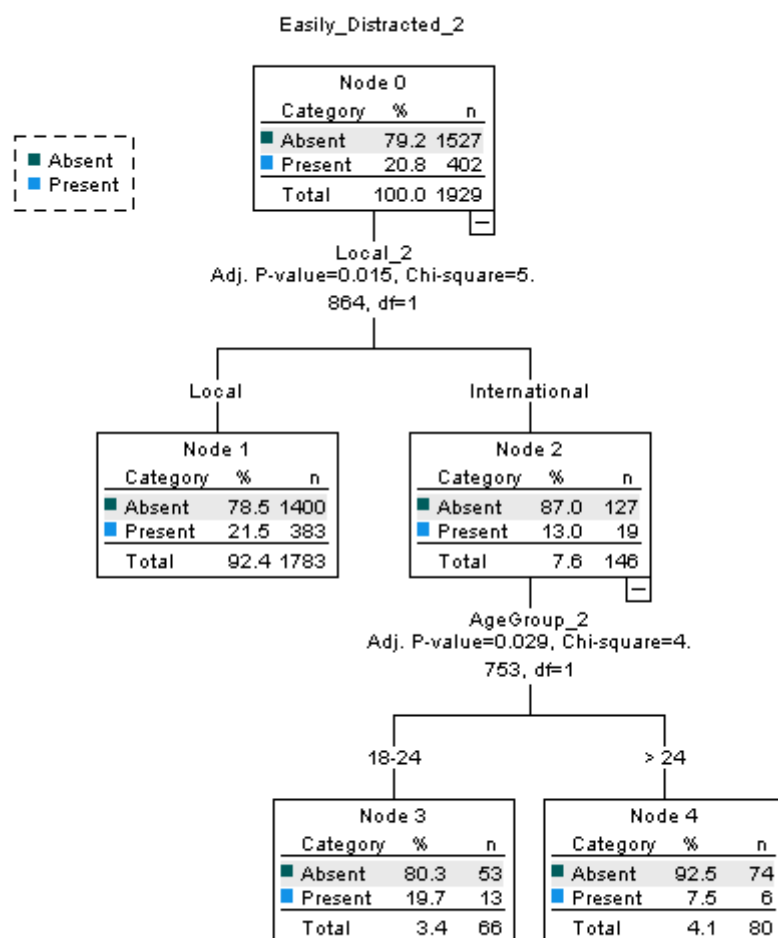


With regard to the Time Management theme (see Figure 4), registration status was the only predictor ($X^2[1] = 13.33$, adjusted $p < .0001$), with part-time students (23.0%, $n = 47$) being statistically significantly more likely to mention this theme than were full-time students (13.5%, $n = 232$). This model resulted in an excellent classification accuracy of approximately 85.5% of the sample (i.e., risk estimate = .145).

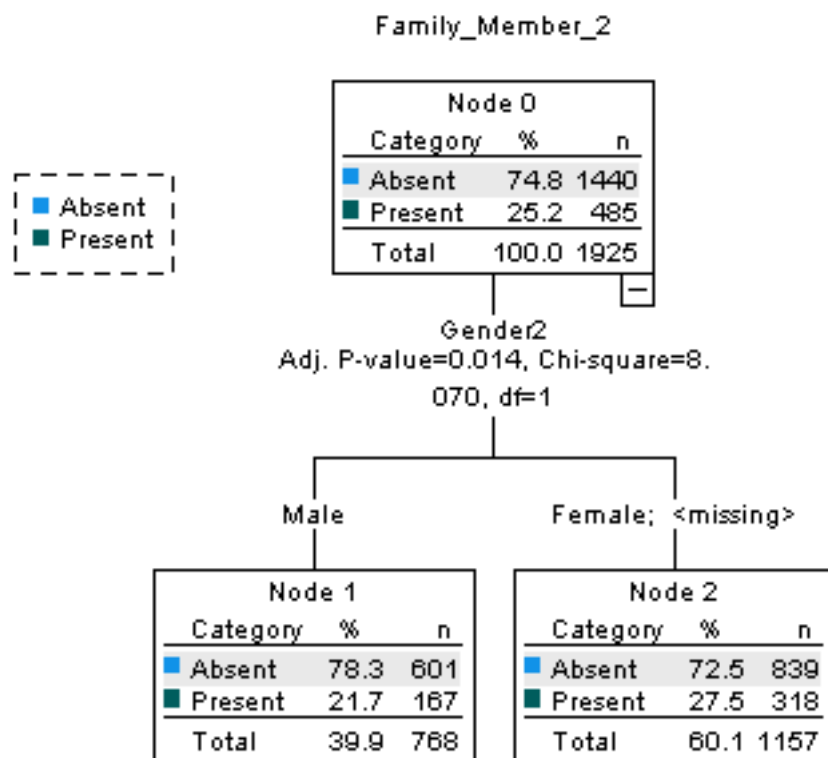
Figure 4. Demographic predictors of the time management theme Identified via the CHAID analysis.



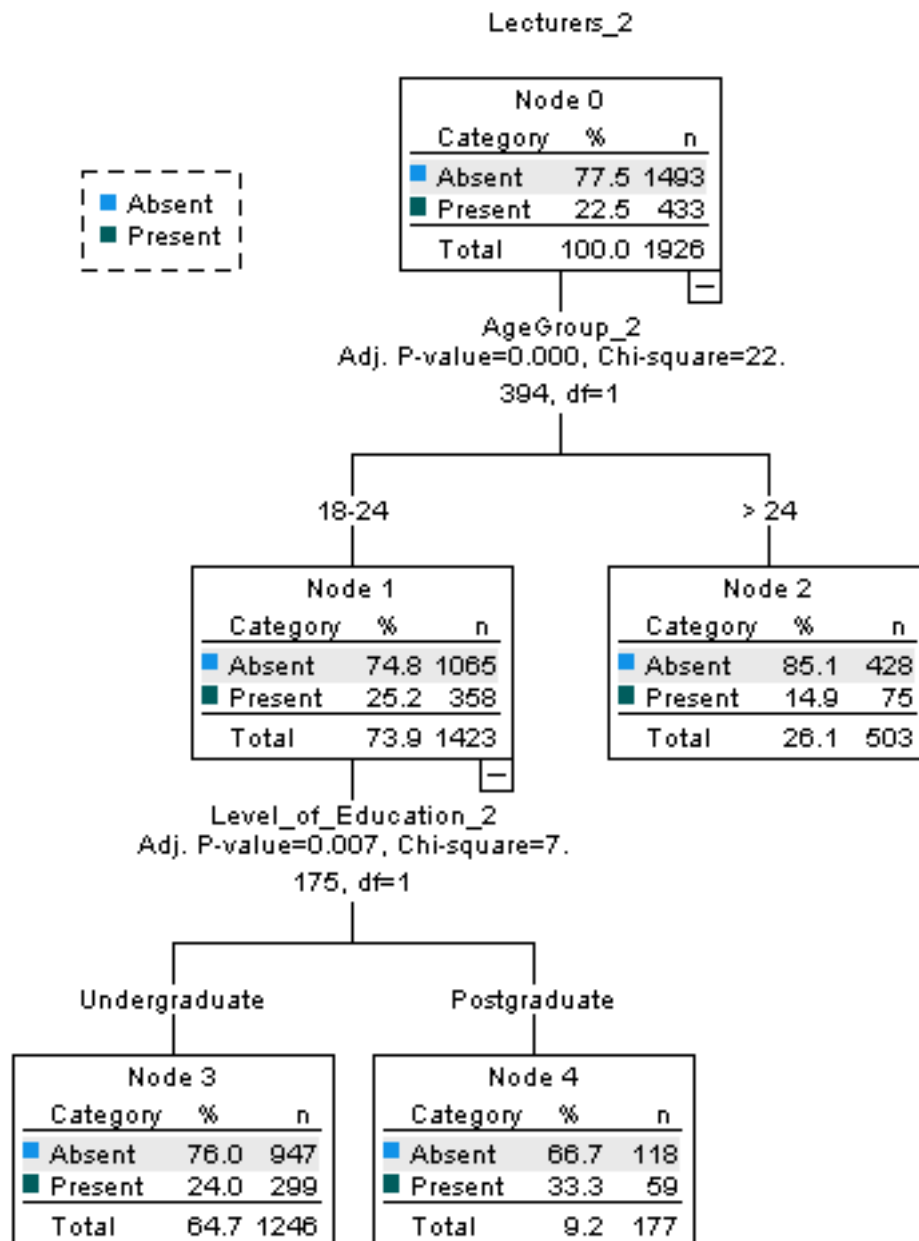
With regard to the Easily Distracted theme (see Figure 5), locality status was the best predictor ($X^2[1] = 5.86$, adjusted $p < .015$), with local students (21.5%, $n = 383$) being statistically significantly more likely to mention this theme than were international students (13.0%, $n = 19$). Age group was the next best predictor. Among international students, students in the 18-24 age group (19.7%, $n = 13$) were statistically significantly ($X^2[1] = 4.75$, adjusted $p = .029$) more likely to mention this theme than were men students (7.5%, $n = 6$). This model resulted in a good classification accuracy of approximately 79.2% of the sample (i.e., risk estimate = .208).

Figure 5. Demographic predictors of the easily distracted theme identified via the CHAID analysis.

With regard to the Family Members/Make it Difficult theme (see Figure 6), gender was the only predictor ($\chi^2[1] = 8.07$, adjusted $p = .014$), with women students (27.5%, $n = 318$) being statistically significantly more likely to mention this theme than were men students (21.7%, $n = 167$). This model resulted in a good classification accuracy of approximately 74.8% of the sample (i.e., risk estimate = .252).

Figure 6. Demographic predictors of the family members/make it difficult theme identified via the CHAID analysis.

With regard to the Lecturers theme (see Figure 7), age group was the best predictor ($X^2[1] = 22.39$, adjusted $p < .0001$), with students in the 18-24 age group (25.2%, $n = 358$) being statistically significantly more likely to mention this theme than were students older than 24 (14.9%, $n = 75$). Level of education was the next best predictor. Among students in the 18-24 age group, postgraduate students (33.3%, $n = 59$) were statistically significantly ($X^2[1] = 7.18$, adjusted $p = .007$) more likely to mention this theme than were undergraduate students (24.0%, $n = 299$). This model resulted in a good classification accuracy of approximately 77.5% of the sample (i.e., risk estimate = .225).

Figure 7. Demographic predictors of the lectures theme identified via the CHAID analysis.

What Demographic Variables are Associated with the Highest Number of Emergent Themes? The total number of emergent themes per participant ranged from 0 to 5 ($M = 1.59$, $SD = 0.81$). Slightly more than one half (51.8%) of the participants provided statements that yielded one theme, one third (33.6%) of participants provided statements that yielded two themes, 10.1% of participants provided statements that yielded three themes, 2.2% of participants provided statements that yielded four themes, and 0.3% of participants provided statements that yielded five themes. Because of the restriction of range of the total number of emergent themes (i.e., 0 to 7), a series of nonparametric point-biserial correlations were computed, namely, Spearman r_s , in order to determine which demographic variables, if any, are correlated with this total number. The Bonferroni adjustment was applied to prevent the inflation of Type I error. After applying this adjustment, the series of nonpara-

metric point-biserial correlations revealed that participants whose responses generated the highest number of themes statistically significantly tended to be women ($r_s = .11, p < .0001$) and local ($r_s = -.06, p < .01$) students, although these correlations were small. That is, to a small degree, women and local students tended to experience the most challenges.

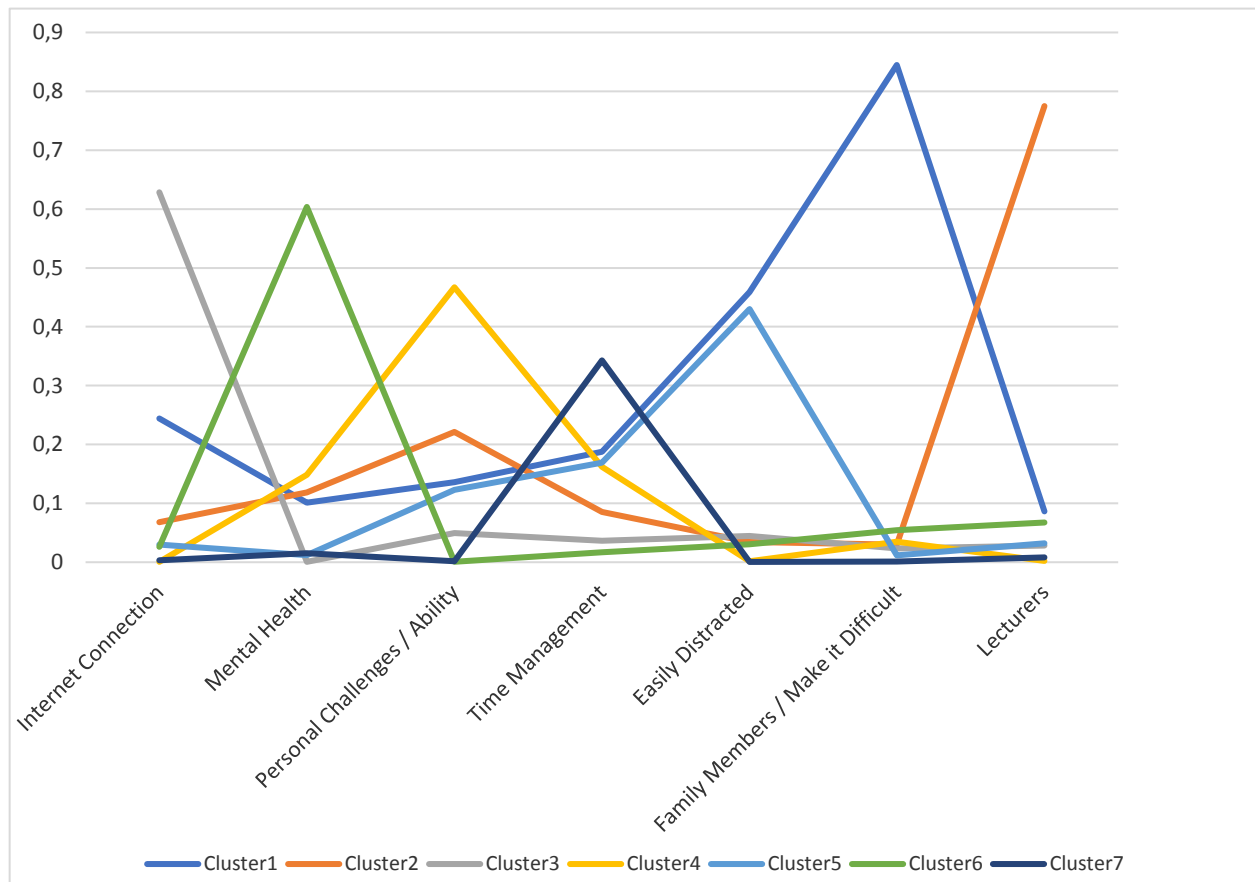
What Narrative Profile Formation Underlies these Seven Themes? A latent class analysis was conducted to determine the smallest number of clusters (i.e., latent classes) that explains all the relationships among the seven emergent themes under the assumption that the student participants could be classified into a small number of distinct clusters known as latent classes depending on their profiles of these emergent themes. This analysis involved what is called *qualitizing* (Onwuegbuzie & Leech, 2021), which Onwuegbuzie and Leech (2019) recently defined as follows:

The technique of qualitizing involves transforming data into qualitative form. The data that are qualitized can either stem directly from quantitative data, or from qualitative data that are converted to numeric form (i.e., quantitized), or both. The qualitizing process can involve one or more qualitative analysis and/or one or more quantitative analysis (e.g., descriptive analyses, exploratory analyses, inferential analyses) that represent either a single analysis (i.e., single qualitizing) or multiple analyses (i.e., multi-qualitizing), which, optimally, involves the full integration of qualitative and quantitative research approaches (i.e., $1 + 1 = 1$ integration formula) that yield fully integrated analysis. (p. 122)

The latent class analysis of the seven emergent themes revealed a seven-cluster solution ($L^2 = 73.42, df = 72, p = .43$, Bootstrap $p = .17$). Figure 8 displays these seven distinct groups of students—or what can be called profile plots (Onwuegbuzie & Leech, 2019, 2021). The seven clusters contained the following proportion of students: Cluster 1 (25.74%), Cluster 2 (19.74%), Cluster 3 (14.84%), Cluster 4 (14.17%), Cluster 5 (10.61%), Cluster 6 (9.08%), and Cluster 7 (5.82%). As seen in Figure 8, the profiles of the seven clusters are as follows:

- Cluster 1: Students belonging to this cluster are relatively low in terms of the Internet Connection, Mental Health, Personal Challenges/Ability, Time Management, and Lecturers themes; moderate with respect to the Easily Distracted theme; and relatively high in terms of the Family Members/Make it Difficult theme. Therefore, this cluster can be labeled as students who represent the *Easily Distracted and the Family Members/Make it Difficult cluster*.
- Cluster 2: Students belonging to this cluster are relatively low in terms of all themes except the Lecturers theme, wherein virtually all (i.e., 98%) of participants in this cluster reported experiences that were classified under this theme. Therefore, this cluster can be labeled as students who represent the *Lecturers cluster*.
- Cluster 3: Students belonging to this cluster are relatively low in terms of all themes except the Internet Connection theme, wherein virtual all (i.e., 97%) of participants in this cluster reported experiences that were classified under this theme. Therefore, this cluster can be labeled as students who represent the *Internet Connection cluster*.
- Cluster 4: Students belonging to this cluster are relatively low in terms of all themes except the Personal Challenges/Ability theme, wherein virtual all (i.e., 98%) of participants in this cluster reported experiences that were classified under this theme. Therefore, this cluster can be labeled as students who represent the *Personal Challenges/Ability cluster*.
- Cluster 5: Students belonging to this cluster are relatively low in terms of all themes except the Easily Distracted theme, wherein virtual all (i.e., 95%) of participants in this cluster reported experiences that were classified under this theme. Therefore, this cluster can be labeled as students who represent the *Easily Distracted cluster*.
- Cluster 6: Students belonging to this cluster are relatively low in terms of all themes except the Mental Health theme, wherein virtual all (i.e., 92%) of participants in this cluster reported experiences that were classified under this theme. Therefore, this cluster can be labeled as students who represent the *Mental Health cluster*.
- Cluster 7: Students belonging to this cluster are relatively low in terms of all themes except the Time Management theme, wherein virtual all (i.e., 95%) of participants in this cluster reported experiences that were classified under this theme. Therefore, this cluster can be labeled as students who represent the *Time Management cluster*.

Consistent with multiple methods ethos, a twostep cluster analysis also was conducted to identify the best number of clusters underlying the seven emergent themes. This twostep cluster analysis also led to the identification of seven clusters, which validated the seven-cluster solution from the latent class analysis.

Figure 8. Profiles of students with respect to the seven emergent themes.

To What Extent Are the Emergent Themes Related to Certain Geographic Locations? The final set of analyses involved comparing the prevalence of each of the seven emergent themes by (a) the province in which each student lived at the time that the study took place and (b) the province in which each student worked remotely. In South Africa, there are nine provinces. Table 12 presents the number and percentage of sample members who live and who work remotely in each province.

Table 12. Provinces where the students live and work remotely.

Province	Province Where Lived		Province of Remote Work	
	Frequency	% of Sample	Frequency	% of Sample
Eastern Cape	79	4.1	66	3.4
Gauteng	184	9.5	155	8.0
KwaZulu-Natal	116	6.0	102	5.3
Western Cape	1,356	70.2	1,408	72.9
Northern Cape	43	2.2	41	2.1
Free State	20	1.0	20	1.0
Limpopo	27	1.4	23	1.2
Mpumalanga	21	1.1	13	0.7
North West	13	0.7	8	0.4

A series of Fisher's Exact Tests, using the Bonferroni adjustment ($\alpha = .007 = .05/7$ themes), revealed statistically significant differences among the province where the students lived with respect to the Internet Connection theme ($\chi^2[9] = 55.26, p < .0001$, Cramer's $V = 0.17$), and among the province in which each student worked remotely with respect to the Internet Connection theme with respect to the Internet Connection theme ($\chi^2[9] = 19.83, p < .01$, Cramer's $V = 0.10$). Statistically significant differences also were revealed among the province where the students worked remotely with respect to the Easily Distracted theme ($\chi^2[9] = 35.22, p < .0001$, Cramer's $V = 0.17$). Figures 9-11 display the three sets of manifest effect sizes (i.e., two representing the Internet

Connection theme and one representing the Easily Distracted theme) that are mapped onto the provinces, yielding what Onwuegbuzie (2021b) refers to as yielding *spatial significance*. It can be seen from Figures 9 and 10 that a statistically significant higher proportion of students with experiences categorized as representing the Internet Connection theme resided and worked remotely in Eastern Cape than in any other province, whereas Figure 11 shows that a statistically significant higher proportion of students with experiences categorized as representing the Easily Distracted theme resided and worked remotely in Western Cape than in any other province.

Figure 9. Manifest effect sizes pertaining to the Internet connection theme by the province where each student lived.



Figure 10. Manifest effect sizes pertaining to the Internet connection theme by the province where each student worked remotely.



Figure 11. Manifest effect sizes pertaining to the easily distracted theme by the province where each student lived.



Discussion

The present study, through the conduct of a meta-methods study, yielded numerous important findings. First and foremost, analysis of the open-ended responses revealed that the students at Stellenbosch University experience several challenges that hinder their ability successfully to learn online during the COVID-19 era. Specifically, the topic modeling led to the identification of the following seven themes: Internet Connection, Mental Health, Personal Challenges/Ability, Time Management, Easily Distracted, Family Members/Make it Difficult, and Lecturers. Of the statements made that were classified under these themes, 10.6% of the sample indicated positive sentiments associated with the challenges that they experienced, either reflecting that they had not experienced any challenges (95.1% of these positive sentiments) or that they actually benefitted from online learning during the COVID-19 era (4.9% of these positive sentiments; 0.5% of the overall statements). However, that 89.4% of the participants indicated a negative sentiment, represents an extremely large effect size that raises cause for concern—especially under the assumption that some, if not most, or even all, of these students might need some form of intervention to assist them in successfully learning online.

Interestingly, Personal Challenges/Ability is the most prevalent theme (30%), followed by Family Members/Make it Difficult (25%). Using Cohen's (1988, pp. 180-183) non-linear arcsine transformation and Cohen's *d* criteria, Onwuegbuzie (in press) provided cut-points of 1% endorsement as representing a small effect size, 7% endorsement as representing a medium effect size, and 16% endorsement as representing a large effect size.

Using these cut-points, five of the seven themes—which range from 21% to 30% (see Table 5)—represent large effect sizes, whereas the remaining two themes—Time Management and Mental Health—represent moderate effect sizes.

Of the seven emergent themes, the most compelling theme—and one that has the most potential for dire consequences and, therefore, needs the most urgent attention—is the mental health needs of students. Indeed, the 12% effect size identified in the present study for the mental health theme is consistent with the 9.5% effect size associated with mental health challenges reported by Onwuegbuzie and Ojo (2021) among students enrolled in another South African University ($n = 4,419$). This theme particularly warrants immediate attention because, as evidenced across both studies, these mental health issues could lead to suicide ideation and even suicide attempts.

Both the Herfindahl-Hirschman Index and the Four-Firm Concentration Ratio revealed that a high percentage of the participants provided thematic responses that represented a high concentration. As stated previously, this indicates that the experiences of the overwhelming majority of participants are characterized by an unequal distribution of challenges. Indeed, the vast majority (85.4%) of the participants provided statements that yielded one or two themes. This suggests that adopting a one-size-fits-all intervention approach for helping students successfully learn online likely would not be effective.

The seven emergent themes mapped onto the following four meta-themes: *Home-Related Challenges*, *Connectivity and Personal Challenges*, *Academic-Related Challenges*, and *Mental Health*. Of these meta-themes, *Connectivity and Personal Challenges* had the largest effect size. This might suggest that attempting to address challenges associated with this meta-theme would assist a greater number of students than addressing any of the three other meta-themes. However, any intervention should include the addressing of mental health issues to the greatest extent possible.

Interestingly, as can be seen from Figure 1, several demographic variables are associated with each of the seven emergent themes. In other words, for each theme, certain subgroups are more likely to experience challenges that were classified under this theme. With respect to the Internet Connection theme, the following three variables are related: age group, locality status, and registration status (see Figure 1). The finding that students older than 24 years of age are significantly more likely than are students in the 18-24 age group to indicate problems associated with Internet connectivity likely reflects the fact that the 18-24 age group are more likely to be *digital natives*, a term that is used to describe students who have grown up around technology (Bennett et al., 2008; Thinyane, 2010). In contrast, students older than 24 years are more likely to be *digital immigrants*—“those [are] not born into a digital world, but who have adopted many of the new technologies” (Thinyane, 2010, p. 406). Now, when by the first week of April 2020, a number of South African universities announced that they were prepared to resume teaching and learning online (Dell, 2020), all of a sudden, these digital immigrants had the extremely difficult task of increasing their digital literacy. Therefore, their lack of digital literacy likely explains why they are more likely to indicate problems associated with Internet connectivity.

The finding that international students are more than twice as likely than are local students to indicate problems associated with Internet connectivity might reflect the fact that international students in South Africa tend to experience more financial challenges than do their local counterparts, as well as challenges associated with accommodation (Dominguez-Whitehead & Sing, 2015). As such, they are less likely to have the finances to guarantee access to the Internet (e.g., be able to purchase sufficient data) and to live in a place where they have adequate Internet connectivity.

Interestingly, part-time students were found to be more likely than are full-time students to indicate problems associated with Internet connectivity. This finding likely reflects the fact that university students who study part-time are generally older. Consistent with this assertion, in the present study, students in the 18-24 age group (99.4%) are 1.64 times (95% CI = 1.52, 1.76) more likely to be full-time students than are the older students (60.7%). And as mentioned earlier, in turn, these older students are less likely to be digital natives.

Evidence from the South African literature indicates that mental health is a big concern in South African universities that requires attention (Padmanabhanunni, 2020). Indeed, in South Africa, one third of individuals develop a psychiatric disorder sometime during their lives (Herman et al., 2009; Kim et al., 2020). Symptoms of depression are prevalent amongst undergraduate students in South African universities (Lawal et al., 2018; Rousseau et al., 2021). With regard to the Mental Health theme that emerged in the present study, the following four variables are related: gender, age group, level of study, and registration status (see Figure 1). Specifically, women students are significantly more likely than are men students to indicate problems associated with mental health. This finding is consistent with the finding of Onwuegbuzie and Ojo (2021), who documented that the women students in their study were 1.70 (95 % confidence interval [CI] = 1.37 to 2.10) times more likely than were men to report having mental health issues. In the current study, the women students are 1.83 times (95% CI = 1.35, 2.47) more likely than their counterparts. These two findings add to the body of evidence that gender plays a

role in mental health, with women generally being at risk for mental illness (Bayram & Bilgel, 2008; Scott-Young et al., 2020). In fact, Bantjes et al. (2019), who collected data on 1,407 first-year students enrolled at the University of Cape Town in 2017 and Stellenbosch University in 2015 and 2017, reported the following:

Female students in SA [South Africa] and those with atypical sexual orientations and disabilities might be at increased risk of CMDs [common mental disorders] for a number of reasons, including the possibility that: (1) they are disproportionately exposed to risk factors, such as interpersonal violence, sexual assault and trauma; (2) they face a higher number of social stressors and less social support than their heterosexual male able-bodied peers; and (3) they continue to be marginalised and experience themselves as being at the lower end of social hierarchies. (Discussion section)

From the responses of these women students, it is clear that the COVID-19 pandemic in general and the lockdown in particular is exacerbating the situation in terms of mental health. Worthy of further investigation is whether, as Cardoso et al. (2019) concluded, compared to men, women might be more susceptible to stress, are more likely to report that they are experiencing stress, and, in some regions of the world, might actually experience more stress.

The finding that students in the 18-24 age group are significantly more likely than are students older than 24 years of age to indicate mental health challenges also is consistent with Onwuegbuzie and Ojo's (2021) findings. However, the odds ratio in the current study (2.76; 95% CI = 1.87, 4.06) is significantly higher than that reported in Onwuegbuzie and Ojo's (2021) study (1.54; 95% CI = 1.15, 2.07). Notwithstanding, both sets of findings support Rousseau et al.'s (2021) conclusion that first-year students are more likely to experience problems associated with mental health. One potential explanation for the higher prevalence of mental health issues reported by the younger students might stem from Colorado and Eberle's (2010) conclusion that younger students might not necessarily have the skills to cope with online learning.

Consistent with the findings of Onwuegbuzie and Ojo (2021) and other studies (Eisenberg et al., 2007; Stallman, 2010), undergraduate students were significantly more likely than were postgraduate students to indicate problems associated with mental health—in this case, being approximately twice as likely (Odds ratio = 2.02, 95% CI = 1.51, 2.72). Interestingly, many of these undergraduate students discussed problems associated with a lack of social contact. Therefore, a recommendation is that, during periods of lockdown, students be encouraged to form virtual social groups (e.g., via WhatsApp) that might provide support to each other. However, it should be noted that the ability to do so likely would depend on Internet connectivity, thereby possibly linking the themes of Mental Health and Internet Connection.

Representing the relationship with the largest level of significance, full-time students are nearly four times (Odds ratio = 3.98 times, 95% CI = 1.90, 8.36) more likely than are part-time students to indicate problems associated with mental health—consistent with the findings of Onwuegbuzie and Ojo (2021), who documented an odds ratio of 3.61 (95% CI = 2.17, 5.99). This finding might have stemmed from the fact that the full-time students were much more likely to be in the youngest age group (82.2%) and to be undergraduate students (76.6%) than were the part-time students (3.9% and 3.9%, respectively). Therefore, age, level of student, and registration status are variables that are inextricably linked in terms of challenges associated with mental health. Another variable that likely is linked to these three variables is place of residence while enrolled at the university. It is possible, if not likely, that leaving residence on campus as a result of the lockdown measures might have created additional stress. And although online learning technologies offer much potential for student engagement, it might differ from on-campus and in-person learning (Robinson & Hullinger, 2008). As such, future researchers should investigate this link among gender, age, level of student, and registration status. Notwithstanding, there is now sufficient evidence from relatively large samples which indicates that “the South African Government should seriously consider providing more funding to universities to address mental health challenges so that university centers that provide interventions (e.g., counseling centers) can be bolstered” (Onwuegbuzie & Ojo, 2021, p. 28).

With respect to the Time Management theme, the following three variables are related: age group, level of student, and registration status. In terms of age group, students older than 24 years of age are more likely than are students in the 18-24 age group to indicate problems associated with time management. Interestingly, university students' self-directed learning skills have been argued as being critical to success (Tekkol & Demirel, 2018). Through self-directed learning, students take responsibility for learning into adulthood (Merriam & Baumgartner, 2020). Further, through self-directed learning, university students take the “the responsibility to learn shifts from an external source (teacher, etc.) to the individual” (Tekkol & Demirel, 2018, p. 2). This notion of self-directed learning encompasses “using learning strategies, motivation for learning, time management, planning etc.” (Tekkol & Demirel, 2018, p. 10).

That postgraduate students are significantly more likely than are undergraduate students to indicate problems associated with time management might be explained by the fact that, generally, the workload for postgraduate students is significantly more than for undergraduate students especially because the focus is more on independent research. The remote mode of teaching and learning could have added more pressure on postgraduate students who might not have access to the university infrastructure, such as the library and the laboratories, especially for those in the STEM (Science, Technology, Engineering, and Mathematics) fields. This finding supports the claims by Albertyn et al. (2008), who argued that time management is very important for postgraduate students.

The finding that part-time students are significantly more likely than are full-time students to indicate problems associated with time management, is consistent with the finding of Onwuegbuzie and Ojo (2021), as well as the literature (MacCann et al., 2012). This finding likely stems from the fact that part-time students, especially those who are engaged in full-time employment, tend to allocate less time to their university degrees.

One demographic variable is associated with the Easily Distracted theme, namely, locality status. Specifically, local students are significantly more likely than are international students to indicate problems associated with being easily distracted. There is a fee differential between local and international students in South Africa, like in other countries within the global North. International students pay higher fees compared to local students (Dominguez-Whitehead & Sing, 2015) and are mostly not able to extend their study time beyond the stipulated time for their registration. So, they avoid distraction and tend to focus more on their studies because they cannot afford fees extensions as a result of their inability to complete their studies on time (Raghuram et al., 2020). In addition to this, according to the Department of Home Affairs (DHA), they cannot afford to exceed the time limit their study permits place on them. Indeed, there are grave consequences for doing so, which include being arrested by the police (Chinyamurindi, 2018).

The following two demographic variables are related to the Family Members/Make it Difficult theme: gender and registration status. With respect to the former, women students are significantly more likely than are men students to indicate problems associated with family members. This finding likely stems from the fact that women are more likely than are men to take on additional household chores/duties, which reify the gender norms/roles and responsibilities in South Africa. Further, gender-based violence is mostly prevalent with women and is strongly related to the home context with family members (Oduro et al., 2012; Selebogo & Ojatorotu, 2013). In turn, this is linked with the dominant nature of patriarchy, especially in South African rural areas (Sathiparsad et al., 2008). Unfortunately, during the COVID-19 pandemic, increased domestic violence has been reported, with the causes being attributed to many factors, including the stresses of reduced finances, work pressure, job losses, and sheer overcrowding at home in some cases (Lautenbach & Randell, 2020). Simply put, women are at the centre of the notions of patriarchy, masculinity, gender-based violence, and family life.

Full-time students are more likely than are part-time students to indicate problems associated with family members. This finding has intuitive appeal because full-time students are less likely to work full-time and, therefore, more likely to spend more time at home—with those who belong to big families having to share a small space with many family members.

The final theme, the Lecturers theme, is associated with the following four demographic variables: age group, level of student, locality status, and registration status. Specifically, students who are more likely to express challenges associated with the online lecture format are students in the 18-24 age group, undergraduate students, full-time students, and local students. Many of these students problematized either the lack of face-to-face interaction with their lecturers or their lack of group/social interactions in class to help them learn. Had these students been physically on campus, they likely would have been more able to seek support from their lecturers and peers. Indeed, there is evidence that peer-to-peer support is a form of mentoring to support university students (Hogan et al., 2017; Jones et al., 2012). Therefore, it is clear that merely being a digital native does not mean that the online learning was provided in a format that interests and engages them adequately, especially bearing in mind that the lecturers were required immediately to teach subjects online that were originally designed for a face-to-face format—hence the phrase *emergency remote teaching*. Consistent with this assertion, undergraduate students and full-time students have been found to have lower levels of online learning readiness (Hung et al., 2010; Onwuegbuzie & Ojo, 2021), presumably because they tend to have less self-regulation abilities than do their counterparts (Onwuegbuzie & Ojo, 2021). The link between the youngest age group and the Lecturers theme confirms the findings of Firat and Bozkurt (2020).

Further, just as there is a *digital divide*, wherein some students have limited or no access to Web 2.0 tools and, therefore, are less computer literate or competent than are their peers, so too is there a digital divide among lecturers, in which some lecturers have little or no experience using a learning management system (LMS) and, as such, their online lecturers are far removed from the best practices for virtual teaching (e.g., Fish & Wickersham, 2009). Moreover, the online format might not have been compatible for some courses/disciplines, such

as those courses requiring more practical, hands-on experiences. Also, the finding that local students are more likely to problematize the online learning format might be explained by the fact that, in the South African context, international students can be more self-directed learners as compared to the local students (Ayliff & Wang, 2006). Finally, the observation that women students, to a small degree, tend to experience the most challenges is worthy of further investigation because it suggests that challenges experienced by students at Stellenbosch University that hinder their ability successfully to learn online during the COVID-19 pandemic has a gender context.

A particularly appealing finding that emerged from the mixed analyses was the identification of a spatial context. Specifically, this spatial context became apparent for the Internet Connection theme and the Easily Distracted theme. That students from the Eastern Cape are the most likely to outline Internet connectivity issues has logical appeal because, despite being the second largest province in South Africa (at 168,966 km²), it is the poorest province. Interestingly, the *spatial correlation* (i.e., correlation between a spatial effect size and a socio-demographic statistic; Onwuegbuzie, 2021b), r_s , between the spatial effect size for the Internet Connection theme for each of the nine provinces where the students worked remotely (see Figure 10) and the poverty ranking of each province (i.e., Range = 1 [richest province; i.e., Gauteng] to 9 [poorest province; i.e., Eastern Cape]) is .44, which represents a large effect size (Cohen, 1988); that is, students who worked remotely within the poorer provinces were much more likely to discuss challenges associated with Internet connectivity than are students who worked remotely within the richest provinces. Even more compelling is the spatial correlation, r_s , between the spatial effect size for the Internet Connection theme for each of the nine provinces where the students lived (see Figure 10) and the poverty ranking of each province, of .61, which represents a very large effect size. Therefore, government intervention is needed to redress the balance among the provinces with respect to Internet connection, network connection, Internet access, network coverage, electricity, and the like. In fact, as recommended by Onwuegbuzie and Ojo (2021), the South African Government and telecommunication companies, in partnership, “should invest in developing Internet infrastructure across South Africa to meet the need for online learning that likely will continue for the foreseeable future, and might even increase as the Fourth Industrial Revolution continues to unfold” (pp. 27-28). Also, instructors, curriculum directors, information technology personnel, and administrators at Stellenbosch University should work together to “develop and distribute online learning platforms that can be implemented on multiple platforms (i.e., cross-platform support) and be used with a wide range of technological devices (e.g., desktop computers, laptops/notebook computers, smartphones) such that different learning approaches (e.g., e-learning, m-learning, u-learning) are supported (Firat & Bozkurt, 2020)” (Onwuegbuzie & Ojo, 2021, p. 27).

The spatial effect size for the Easily Distracted theme is extremely large. Specifically, whereas less than 10% of the students from the other eight provinces outlined challenges that represented being easily distracted, 60% of students from the Western Cape indicated being easily distracted from learning online by an array of distractions. This finding has led to several questions, such as the following: To what extent does the large spatial effect size associated with the Western Cape reflect the fact that Stellenbosch University is located in the Western Cape? Therefore, much research is needed to understand this finding further.

Summary and Conclusions

Toquero (2020) made a call for researchers “to produce studies to proliferate and document the impact of the pandemic to the educational system” (p. 1). As such, the present study represents a response to this call, by replicating and extending Ojo and Onwuegbuzie’s (2020) study. This meta-methods research study led to a comprehensive identification of the challenges that have been experienced by students at Stellenbosch University that hinder their ability successfully to learn online during the COVID-19 pandemic. These challenges can be classified into seven types (i.e., themes), which, in turn, can be collapsed into four dimensions (i.e., meta-themes) and that yield seven profiles of students—demonstrating that these challenges are multi-dimensional. Disaggregating these data by demographic and location variables has led to the identification of subgroups who are most at risk for experiencing each challenge types. Such identification should enable administrators at Stellenbosch University, and perhaps even beyond, to develop interventions for students to address these challenges that are primarily targeted at the relevant subgroups (e.g., adaptive learning systems; Anderson, 2004), rather than adopting a one-size-fits-all approach (Armatas et al., 2003; Firat & Bozkurt, 2020; Morse, 2003; Onwuegbuzie & Ojo, 2021). As these interventions are developed, they should be evaluated using rigorous research and evaluation approaches in order to identify and to document the most effective and efficacious interventions that can make future online learning experiences as positive as possible for as many students as possible.

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